SOCIOECONOMIC IMPACT OF INFILL DRILLING RECOVERY FROM CARBONATE RESERVOIRS IN THE PERMIAN BASIN, WEST TEXAS

A Thesis

by

BRYAN KEITH JAGOE

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

May 1994

Major Subject: Petroleum Engineering

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ABSTRACT

Socioeconomic Impact of Infill Drilling Recovery From Carbonate Reservoirs in The Permian Basin, West Texas. (May 1994))

Bryan K. Jagoe, Texas A&M University

Chair of Advisory Committee: Dr. Ching H. Wu

This investigative study presents results on the socioeconomic impact of infill drilling recovery from carbonate reservoirs in the Permian Basin. The amount of incremental oil and gas production from infill drilling in 37 carbonate reservoir units is established using decline curve analysis. The increase in incremental recovery is used to compute the amount of increased revenue and taxes (local, state and federal). A job market analysis is performed to determine the impact of these increased revenues on primary jobs in the oil industry and secondary jobs in the community. Secondary jobs are generated by oil industry workers spending money in the community. The appropriation of the estimated taxes is analyzed to determine which government agencies benefit most from the infill drilling.

The observations from this research are that most of the San Andres and Clearfork carbonate reservoir units in the Permian Basin are potentially profitable to infill drill. The incremental oil and gas production from infill drilling could maintain or create many primary jobs within the local oil industry and also secondary jobs in the community. The incremental production could generate taxes which would greatly benefit certain local, state, and federal government agencies.

This research proposal presents a methodology to calculate the amount of incremental oil and gas production from infill drilling, calculate the amount of revenue and taxes generated from the incremental production, determine how the increased reserves

DEDICATION

This thesis edicated to:

My faith in Christ which gave me the strength and wisdom to complete the task at hand and my beautiful wife Donna Ann Jagoe and our lovely daughter Elizabeth Anne Jagoe, I shall always be grateful for the love, guidance, support, and inspiration they have given me through the course of time. To the rest of my family, thank you for your prayers of support.

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To the United States Navy and the citizens of the United States for furnishing the means for me to return to graduate school.

affects the job market in the communities and how the increased taxes help government agencies. These results could be helpful in bolstering the oil industries image in local town meetings, in government permitting processes, and in lobbying state and federal congresses to acquire investment aid or tax breaks for oil field investment projects.

The technical contributions of this research proposal are as follows: (1) presents a methodology including the parameters used in determining profitable infill drilling projects in the San Andres and Clearfork units of the Permian Basin, (2) develops a correlation between the increased revenues of infill drilling and the creation of jobs in the Permian basin communities, and (3) develops a correlation between the increased tax revenues of infill drilling recovery and the benefits to local, state, and federal agencies.

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CHAPTER 1

INTRODUCTION

Since the drilling of the first oil well by "Colonel" Edwin L. Drake in 1859 near Titusville, Pennsylvania, a large sector of the United States population have earned a living from the oil industry.[26] Many towns and cities have developed, and then later disappeared depending upon the amount of oil and gas produced near their community. Throughout the years, the prosperity and livelihood of West Texas has been linked to the amount of oil and gas production in the Permian Basin. Today, the citizens are heavily dependent upon the oil and gas production thus creating a need to find new recovery technologies, e.g. infill drilling.[18]

The purpose of this research is to study the correlation between the amount of incremental infill drilling recovery, and the revenue plus jobs generated by this incremental recovery. This information would be very useful to the oil companies investing in the Permian Basin. The local, state and federal governments would be interested in this study as well to offer incentives for oil companies to drill in this region. The Chamber of Commerce usually promotes these types of business incentives for towns and cities. However, in this situation, the government must take control because the oil fields are scattered throughout many towns.

The subject topic has been studied by the major oil companies for investment and lobbying purposes. But, as the major oil companies migrate overseas, they take with them the mechanism to make large investments which generate revenue and create many jobs in the area. They also take with them the

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This proposal follows the style of Journal of Petroleum Technology.

oil lobby power in the Congresses of Texas and of the United States.[27] As more independent oil companies move into West Texas, the oil companies and the citizens will have to combine forces with lobby groups such as the American Petroleum Institute (API)[18] and the Independent Petroleum Association of America (IPPA). These lobby groups could formulate ways to link improved oil recovery such as infill drilling with revenue and jobs. Then, they can lobby the state and federal government for help with funding of large investment projects and tax reliefs. These actions will keep the economy of the Permian Basin strong and its citizens employed.[27]

Two good infill drilling targets are the San Andres and Clearfork formations because they are two of the most prolific oil producers. Fig. on p.4 and p.5 are location maps for major Clearfork and San Andres waterflood units, respectively. These carbonate reservoir units are complex and heterogeneous, thereby, responsive to infill drilling development.[15] Also, they are good targets because the San Andres carbonates combined with Grayburg Formations dominate the Permian Basin's oil-resource base, containing more than 50 percent of the original oil in place (OOIP) and 56 percent of the estimated ultimate recovery. The Clearfork carbonates combined with Sprabarry-Dean sandstones account for nearly 25 percent of the Permian Basin's OOIP but only 13 percent of the ultimate recovery[28]. Much more oil remains in these reservoirs and is presently unrecoverable due to the large well spacing, approximately 37 acres per well.

The present status of these reservoirs is that most have been discovered, drilled, and waterflooded. Interest in these reservoirs is rising due to the large incremental infill well recoveries observed in the Clearfork and San Andres formations. The infill wells are placed between existing wells and are separated by standard distances defined by regulatory agencies. This allows the new wells to capture the oil and gas that cannot be recovered by the existing wells.[15]

The results of this research will show a methodology to calculate the incremental oil and gas production from infill drilling recovery, calculate the amount of revenue and taxes generated from the incremental production, determine how the increased revenues affect the job market in the communities and how the increased taxes help government agencies. See Fig. 1.1 and 1.2 as follows.

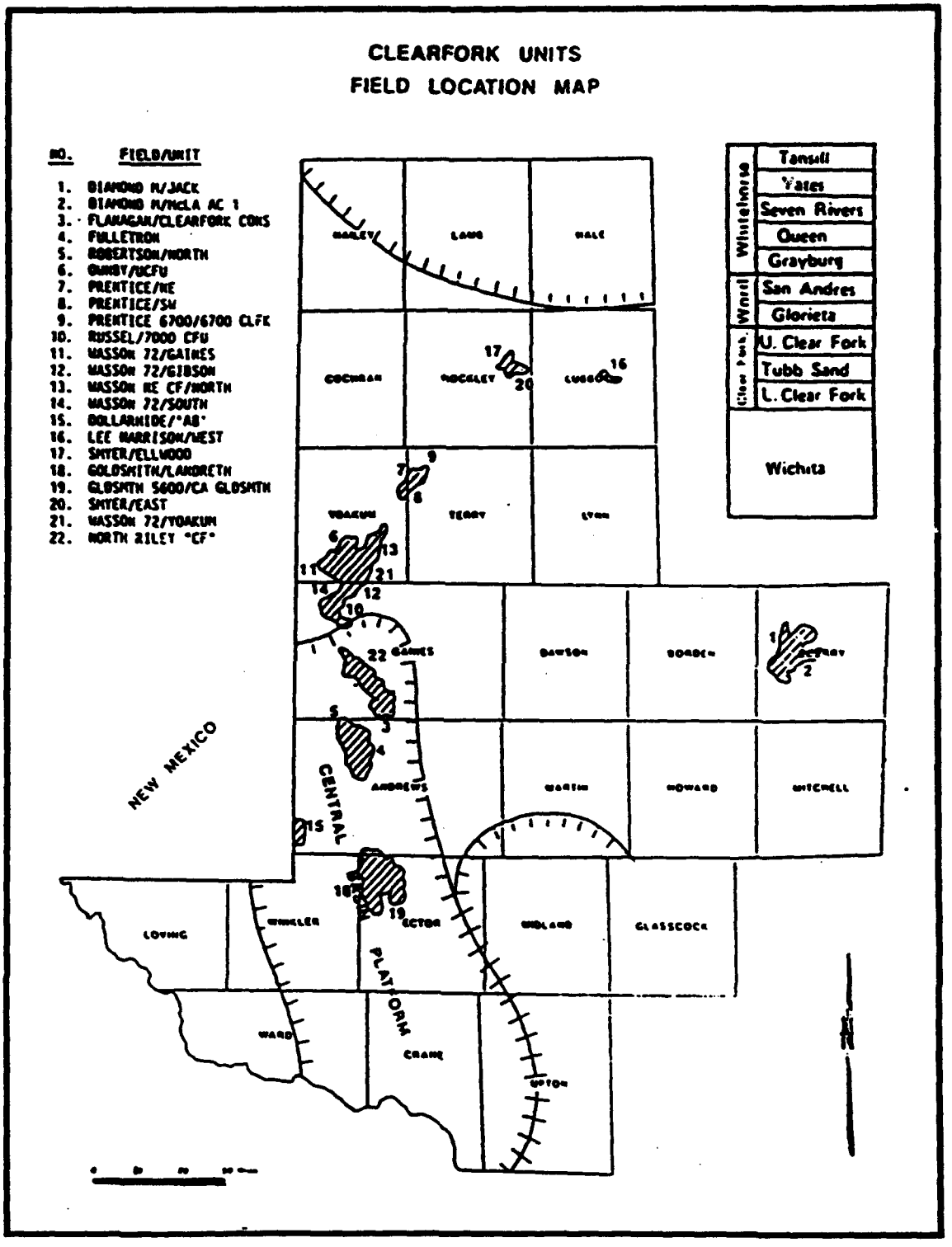

Fig. 1.1—Clearfork units field location map.

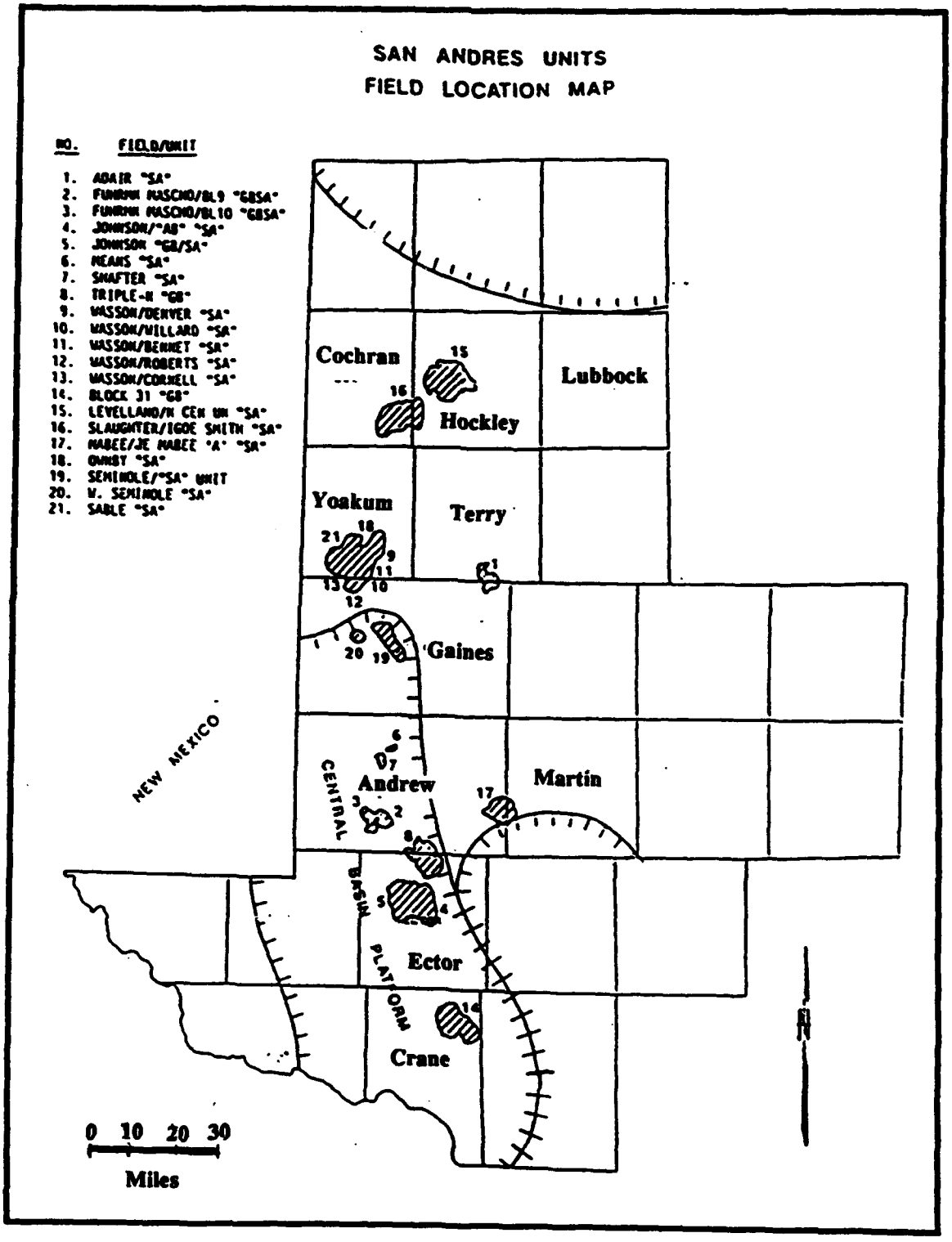

Fig. 1.2—San Andres units field location map.

CHAPTER II

LITERATURE REVIEW

2.1 Carbonate Reservoir Infill Drilling Recovery

The majority of the available literature on infill drilling in the United States is related to West Texas carbonate reservoirs. The reason is that many of the United States' giant oil fields are located in the Permian Basin. The Permian Basin contains 21% of the United States' Original Oil in Place. Much of the oil remains in these giant reservoirs and is unrecoverable under existing operating strategies. But, these carbonate reservoirs are particularly complex and thus responsive to infill drilling development.[15]

A recurring theme in the reviewed papers eventually lead to the same conclusions as to the success of infill drilling. The first conclusion was eluded to previously, i.e complex geology. Individual pay intervals are typically thin, spread over thick (gross) sections of complex carbonate rock, and limited in areal extent. Wells are normally concurrently completed in many such pay intervals. Many articles[2-6] reported that improving the pay continuity between wells is a primary reason for the success of infill drilling. Barber et.al.[6] reported that West Texas carbonate reservoirs are more discontinuous than originally believed from studies conducted on units with varying well spacings.

The second conclusion is, within pay intervals, the rock is highly heterogeneous. This results in lower than expected primary and waterflood recoveries because the oil is slow to move from areas where the rock is tighter. V.J. Driscoll[12] describes the advantages of infill drilling in low permeability waterfloods. He illustrated nine factors affecting recoveries including pattern and improved sweep efficiencies. L.H. Stiles[6]

studied the effect of infill drilling to increase the reserves in nine different fields located in Texas, Oklahoma, and Illinois. He found that infill drilling can enhance both areal and vertical sweep efficiencies, thus improving oil recovery.

The third conclusion is that these formations can be anisotropic. This results in reservoirs preferentially flooding in a particular direction.[15]

2.2 Reservoir Data Base

The Improved Oil Recovery Consortium at Texas A&M University established a data base for San Andres and Clearfork reservoirs to study the impact of infill drilling on oil recovery and economics. The data base includes thirty-seven carbonate waterflood units ranging in size from 3 to 2,166 MMSTB original oil-in-place, and incremental infill drilling recoveries ranging from 225 to 558,986 MSTB. This database is used in this research paper to study the socioeconomic impact of infill drilling recovery from carbonate reservoirs in the Permian Basin.[16-17]

2.3 Link Between Oil Production and Jobs

Most of the literature linking enhanced oil recovery, the local economy and jobs has been government statistical reports. The Texas Comptroller maintains an economic computer program called "The Texas Input-Output Model" which correlates the number of jobs to gross production revenues at the production well head. Also, the model shows how Texas industries and the oil industry depends upon each other.[29] Another model which is used to calculate the national economic outlook is the U.S. Department of Commerce Detailed Input/Output model of the U.S. Economy. This model is used to calculate the effects of the economy on a national level.

Noel Tyler[40] and Mark Holtz[40] at the Bureau of Economic Geology said that the Bureau had no method to compute oil

production into dollars but he contracts this type of calculation to Southwest Econometrics, Austin, Texas. A sample of this calculation is found in the report to the governor of Texas 1989.[25] The governors report is a study on this topic to support bill S.828, "The Enhanced Oil and Gas Recovery Tax Act of 1989," in the United States Congress. The bill would provide tax incentives for the removal of crude oil and gas through enhanced recovery techniques and tax credit for research and development to discover improved tertiary recovery methods.[25]

Many other agencies were contacted as well but did not provide a link between oil production and jobs. At Texas A&M University, the following agencies were contacted; the Economics Department and the Director of the Center for Business Economic at Texas A&M University.[40] They did not know of a method to convert oil production into jobs.

In the Bryan College Station area, the following agencies were contacted. The City of Bryan city planners,[40] the city engineer[40] and the county auditor of Brazos County[40] and they had no link between petroleum production and jobs.

In Midland, Texas, the following agencies were contacted. The Midland Chamber of Commerce,[40] the Permian Basin Petroleum Association,[40] the County Auditor,[40] and the School Board Councils of Midland and Ector counties.[40] They were not aware of a link. The auditor and school boards sent a copy of their financial audit which will be discussed in Chapter 6.

In Washington D.C., the following agencies were contacted. The American Petroleum Institute (API),[40] the Department of Energy, Oil and Gas Processing Office[40] and both recommended to check the Department of Commerce Input/Output model which was mentioned earlier.

In Austin Texas, the following agencies were contacted. The University of Texas at Austin Economics Department,[40] the Bureau of Business research,[40] the Petroleum Extension Service at U.T. Austin,[40] the Texas Commerce Commission[40] and the the Railroad Commission.[40] None had any link between oil production and

jobs. Even though the Texas Railroad Commission does not perform economic analysis on the oil industry, they were very helpful in pointing out agencies with information on the petroleum industry.

A non-government study by G. D. Krueger[40] has investigated the types of jobs which will be created if the oil price increases in the United States oil industry.[20]

2.4 Tax Collecting and Appropriation Structure

The literature describing how the oil industry is taxed and the appropriation of the tax money is found in government reports. For local governments, the tax revenue and expenditures are found in the county auditors report and the county school board financial report.[30-32] For the State of Texas, the financial information is located in the Texas Comprehensive Annual Financial Report.[33] Finally, the federal financial information is in *the Budget of the United States.*[34] These financial reports are published each year by the respective agencies. This research paper studies these reports and determines the impact of oil and gas revenues on the well being of the local community.

2.5 Social, Political, and Economic Impact of Oil

The literature reviewed on the social, political and economic impact of oil can be summed up in the following way. The impact of the oil production increase will affect the redistribution of economic activity across the nation. This increase will mainly stimulate the growth in the under-employed regions of the country. This growth will most likely result in an overall increase in U. S. economic activity and the increased production could help balance the foreign trade deficit. Finally, the most important positive economic impact of increased oil production is the United States reduced dependency upon imported oil especially at a time of a foreign oil shortage.[18-20]

CHAPTER III

EVALUATION OF DECLINE CURVE ANALYSIS

3.1 General Description of Data Base

The first step in this economic study of infill drilling recovery is to assemble a reservoir data base for analysis. The data collected for this research is stored on a computer data base created by the Improved Oil Recovery Consortium (IORC) at Texas A&M University. The data base is large enough to be statistically relevant. Pertinent information was collected to include as many reservoir, rock, fluid and geologic characteristics as could be obtained from public records and operators. Sixty waterflood units which have had a substantial amount of infill drilling development were studied. But only twenty-two Clearfork and twenty-one San Andres waterflood units were considered in the final analysis due to the amount of information available. Table on p.17 explains the abbreviations used in the enclosed tables. The extensive database of information is compiled in Tables on p.18 and p.21.

This economic analysis will study the Clearfork and San Andres formations which will be evaluated in the same manner due to the similarity of the following factors: 1) geographic age, 2) depositional environment, 3) geographical location, 4) drive mechanism and 5) lithology. Data was gathered from Forms H-1 and W-2 and engineering and geological reports on file at the Texas Railroad Commission. The form H-1 is the application to inject fluid into a reservoir productive of oil or gas. Companies who operate units in this study also contributed much information. Precision and consistency are of primary concerns. The porosities and water saturations, key reservoir properties normally obtained from logs, were obtained from form H-1. The information from this form is valuable to this study because

operators of the units file the form many years after primary production has been established and the long production history has been analyzed. Also, the OOIP is recorded on this form. The information received directly from the operators is particularly useful because they have further improved their estimates of reservoir properties following detailed reservoir studies of logs, cores, production, pressures and other data.[17]

3.2 Parameters For Decline Curve Analysis

Estimates of infill drilling recoveries are obtained from production decline curve analysis. An interactive commercial computer graphics program called IPGRAF by Energy Software International (ENSYTE) is used to find the best curve-fits. An example is shown in Fig. on p.15. Production curve segments could be isolated and expanded for better resolution. Often, curve smoothing, editing, and automatic curve-fit routines were utilized to determine the best production rate of decline. More often than not, decline rates after infill development were similar to those following waterflooding. Attempts were made to isolate and nullify the effects of enhanced oil recovery (EOR) methods which are present in only a few units. Other assumptions required were abandonment production rates. Economic limits of 3 BOPD per active well are used to calculate the final rate for primary development, and 3 BOPD per active production and injection well are used during waterflooding and infill development stages[17].

3.3 Observations From Decline Curve Analysis

Tables on p.18 and p.21 list the important economic data which is obtained from the decline curve analysis. In order to establish that reservoirs in the Clearfork and San Andres formation can be economically evaluated in the same manner, the following reservoir properties and production performances are compared for similarities. Well spacings during primary recovery

stages are the same between the two formations with an arithmetic mean (mean) of 51 acres per well. The San Andres has a lower well spacing during waterflood and infill development stages which is 34 and 25 acres per well respectively. The spacing observed for the Clearfork units is 40 acres, and 28 acres per well, respectively. The smaller well spacing may be due to the fact that San Andres is shallower than Clearfork, and San Andres wells are less expensive to drill and complete. Other reservoir properties are similar between the formations such as the mean pay thickness, porosity, permeability, and initial oil saturation. The values for the San Andres are 74 feet, 8.88%, 6.93 md. and 74.01%, respectively, and for the Clearfork, 79 feet, 7.95%, 4.86 md. and 69.45%, respectively. Due to the similarity of these two formations, their reservoir and production performances will be evaluated in the same manner.

3.4 Incremental Oil Recovery From Infill Drilling

The production data shows that the OOIP of the IORC Clearfork units ranges from 3 MMSTB to 1,029 MMSTB, and the IORC San Andres units ranges from 3 MMSTB to 2,166 MMSTB. Incremental infill drilling recoveries per unit ranges from 212 to 98,561 MSTB in the Clearfork and 285 to 558,986 MSTB in the San Andres. To calculate the percentage of infill drilling recovery for both reservoirs which will be extrapolated to the entire Permian Basin, the units flooded with CO_2 were excluded. CO_2 injection is normally combined with infill drilling and it becomes hard to determine which recovery method accounts for what percent of the incremental oil recovery as shown in Tables 3.2 and 3.3. The over all incremental infill drilling recovery for the IORC San Andres units is 6.39 percent of the OOIP or 174 MMSTB. The incremental recovery for the IORC Clearfork units is 5.06 OOIP or 219 MMSTB.

3.5 Correlating the IORC Infill Drilling Development Units to all the Permian Basin Clearfork and San Andres Reservoirs

To expand the economic study on infill drilling development to the entire Permian Basin, correlations will have to be established between the IORC units and the rest of the Clearfork and San Andres reservoirs in the Permian Basin. Fig. on p.16 shows a simplified stratigraphic column and relative oil productivity of the Permian Basin. The following correlation will show that the IORC units are a good representation of all the San Andres and Clearfork formations. The IORC units are compared to two other resources which contain reservoir info. on the subject formations for the entire Permian Basin. The first is the Bureau of Economic Geology (BEG) "Atlas of Major Texas Oil Reservoirs."[36] The reservoir properties are listed in Tables on p.24 and p.25. The 2nd. source is the BEG Geographical Circ. 89-4.[28]

Table on p.27 compares the reservoir properties of the above two publications with the IORC units. The mean porosity, permeability and initial oil saturation are similar between three resources. The IORC San Andres units mean values are 9.88%, 6.93 md. and 74.01% and the BEG atlas San Andres reservoir mean values are 11%, 12 md. and 73% respectively. The BEG Circular does not contain this information. The mean values for the IORC Clearfork units are 7.95 %, 4.86 md. and 69.45% and the BEG Atlas Clearfork reservoir mean values are 10%, 12 md. and 72%, respectively.

The percentage of cumulative production versus OOIP and the ultimate oil recovery versus OOIP are similar between the IORC units, the BEG Atlas reservoirs and the BEG Circular. The IORC values for the San Andres units are 27.94% and 28.39%, the BEG Atlas reservoirs are 26.41% and 32.4% and BEG Circular are 26.17% and 32.28%, respectively. The IORC values for the Clearfork units are 21.88% and 26.20%, the BEG Atlas reservoirs are 20.03% and 22.79%, and BEG Circular are 13.19% and 16.26%, respectively. The ultimate oil recovery divided by OOIP is

slightly higher for the IORC Clearfork units compared to the other two references because the units in the IORC study have had more recent production information collected thus allowing for better production estimates. Also, more production history has been collected on the IORC units. This comparison shows that infill drilling can extend the life of a Clearfork reservoir. The ultimate recovery divided by the OOIP is slighty lower on the IORC San Andres units because the IORC units have only been waterflooded and infill drilled and the recovery numbers in the BEG Atlas San Andres reservoirs and the BEG Circular, which accounts for all the San Andres reservoirs in the Permian Basin, represent reservoirs in all stages of production including Enhanced Oil Recovery (EOR).

To hypothetically project the incremental infill drilling oil recovery for the entire Permian Basin, the incremental recovery is first calculated using the IORC data base. The incremental infill drilling recovery for the San Andres is 6.39 percent of the OOIP which is accomplished by reducing the well spacing down to a mean of 25 acres per well. This number will be extrapolated out using the OOIP from the BEG Circular. Therefore, 6.39 percent of the entire Permian Basin San Andres formation's 53,910 MMSTB OOIP is equal to 3,445 MMSTB. The incremental infill drilling recovery for the Clearfork is 5.06 percent of the OOIP which is accomplished by reducing the well spacing to a mean of 28 acres per well. This number will be extrapolated out using the OOIP from the BEG Circular. Therefore, 5.06 percent of the entire Permian Basin Clearfork formation's 24,600 MMSTB OOIP is 1,245 MMSTB. This incremental infill drilling recovery will be used again in the economic analysis in chapter IV.

In Table on p.28, the average oil price in Texas since 1981 is $23.45/bbl. The subject infill drilling projects began in 1981 as well. Assuming the price will be constant at $16.00/bbl for the next 35 years, the average price of oil is $18.00/bbl. Oil prices of $18.00, $20.00 and $22.00 are used in this study. See Fig. 3.1 through 3.2 and Tables 3.1 through 3.7 as follows.

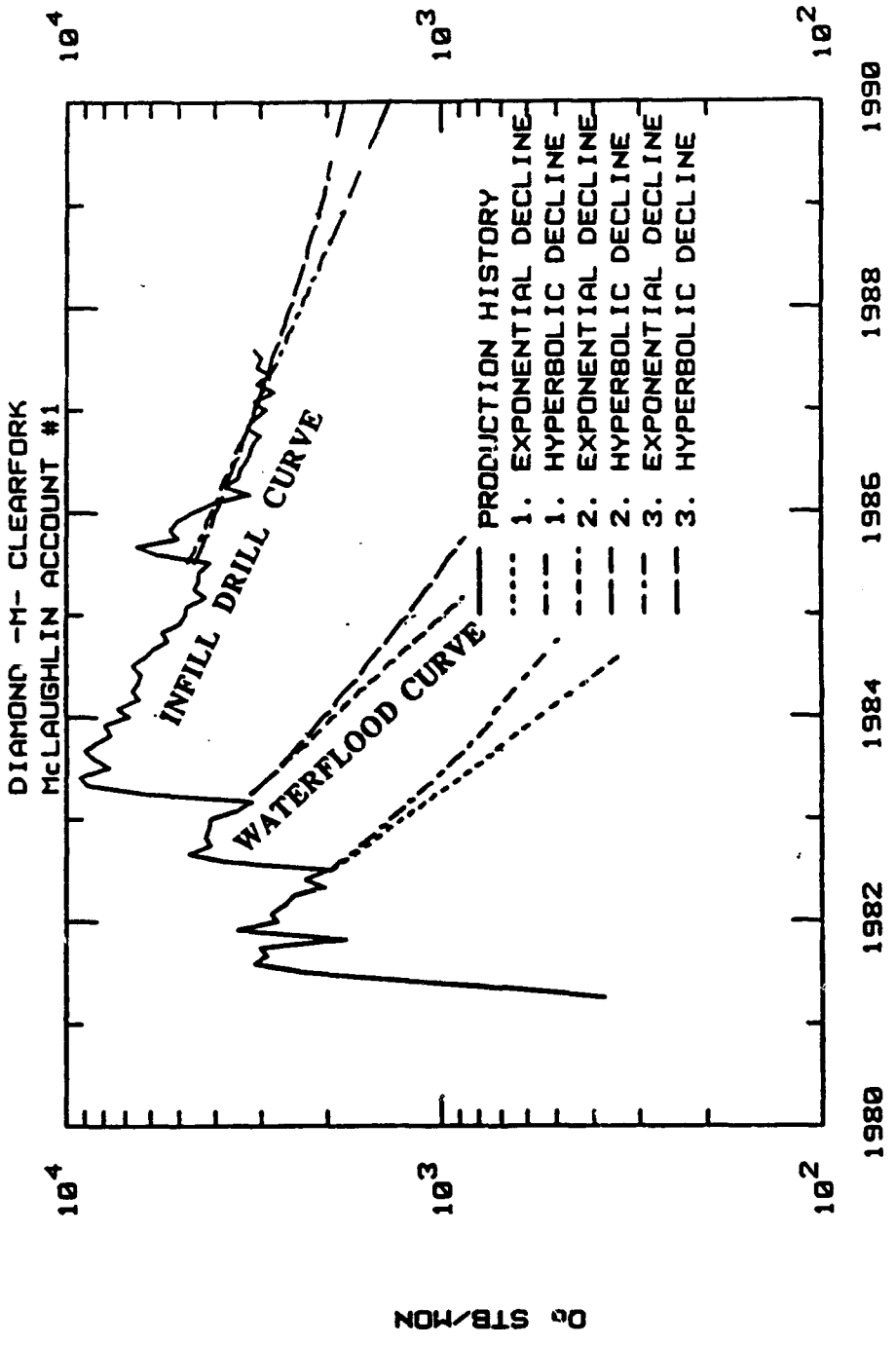

Fig. 3.1—Example of curve fitting using computer program IPGRAF.

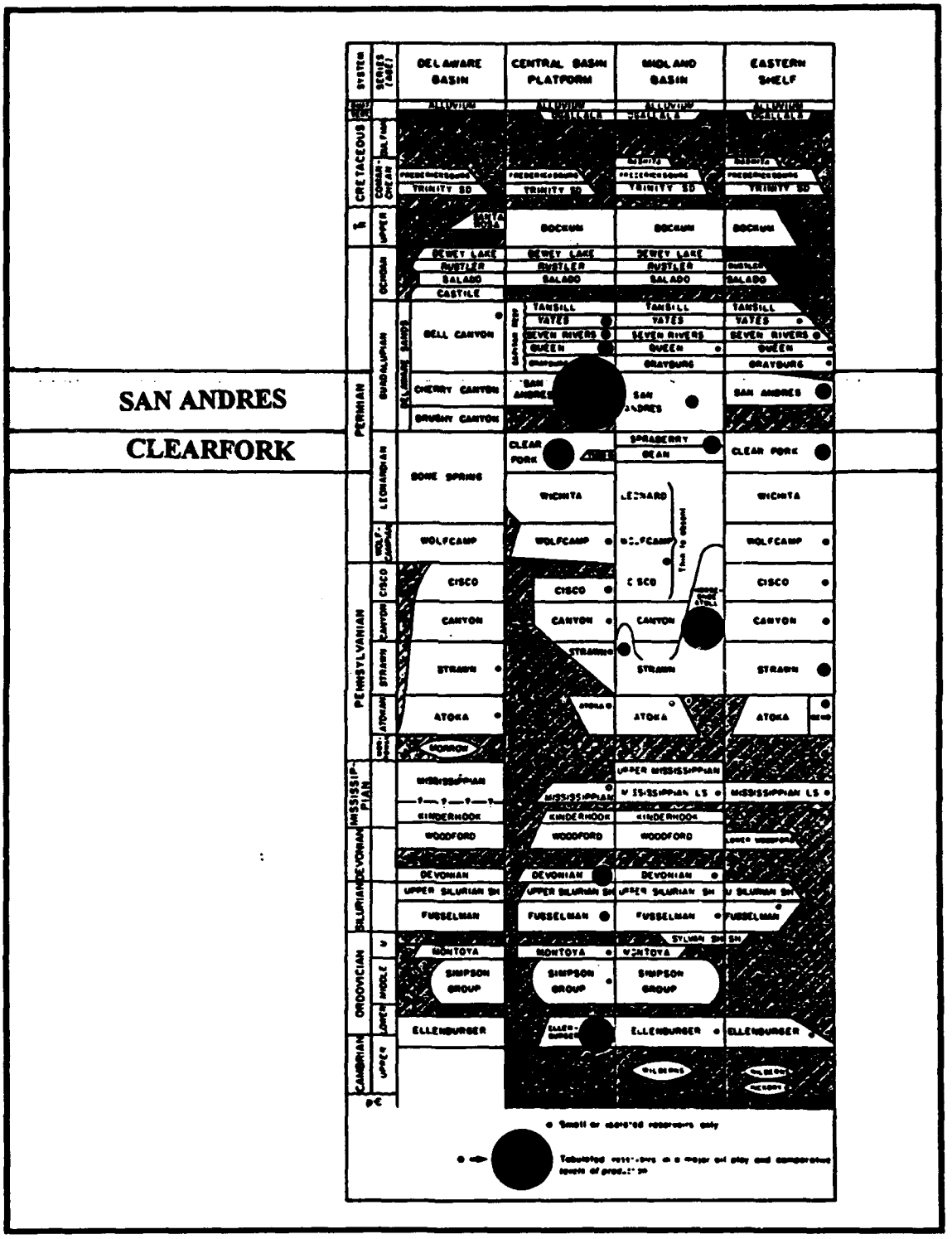

Fig. 3.2—Simplified stratigraphic column and relative oil productivity of the Permian Basin (after Galloway and Others, 1983).

TABLE 3.1–PARAMETERS USED IN TABLES

ABBR.	DEFINITION
API	Oil Specific Gravity.
ATLAS	BEG "Atlas of Major Texas Oil Reservoirs," 1985
AREA	Area of reservoir.
BEG	Bureau of Economic Geology
CO_2	Units with CO_2 injection.
CUM PROD	Cumulative oil production.
DEPTH	Depth of reservoir.
FVF	Formation volume factor.
GROSS	Gross thickness.
INCOIL	Incremental oil recovery from infill drilling.
IORC	Inhanced oil recovery consortium at Texas A&M University
IR	Ultimate infill drilling recovery efficiency; = 100*UIR/OOIP.
IWS	Infill drilling Well Spacing.
NET	Net thickness.
OIP-IIF	Oil in place at the start of infill drilling.
OOIP	Original oil in place.
PERM	Permeability of reservoir.
POR	Porosity.
PR	Ultimate primary recovery efficiency; = 100*UPR/OOIP.
PRESS	Initial reservoir pressure.
PROD TECH	Latest production technologies use on the units.
PWS	Primary well spacing.
REC EFF	Ultimate oil recovery with known technologies/OOIP
SWI	Initial water saturation.
SOI	Initial oil saturation; =100.-SWI.
SOR	Residual Oil saturation.
UIR	Ultimate infill drilling recovery.
ULT RCVY	Ultimate oil recovery
UPR	Ultimate primary recovery.
UWR	Ultimate initial waterflooding recovery eff.
VIS	Viscosity of oil.
WR	Ultimate initial waterflooding recovery eff.; = 100*UWR/OOIP.
WWS	Initial waterflooding well spacing.

TABLE 3.2--CLEARFORK DATA BASE

	UNITS	INFILL DRILLE (Date Started)	SOI (%)	AREA (acre)	DEPTH (ft)	NET (ft)	GROSS (ft)	PRESS (psi)	FVF (RB/STB)
1	DIAMOND M/JACK	Aug-80	60.00	320	3170	34	105	1600	1.18
2	DIAMOND M/McLA AC 1	Jul-85	62.00	720	3170	32	65	1200	1.18
3	DOLLARHIDE/'AB'	------	82.00	2,631	6500	68	357	2890	1.39
4	FLANAGAN/CLEARFORK CON	Jul-81	75.10	4,850	6380	32	468	1875	1.26
5	FULLERTON	Jan-81	77.70	29,542	6700	87	500	2940	1.5
6	GLDSMTH 5600/CA GLDSMTH	May-83	69.00	15,200	5600	75	350	2330	1.5
7	GOLDSMTH/LANDRETH (2)	Jan-80	74.00	7,814	5550	39	345	2330	1.4
8	LEE HARRISON/WEST	Mar-79	58.00	920	4850	44	84	2000	1.1
9	NORTH RILEY "CF"	Jan-84	67.00	6,960	6300	65	66	2760	1.29
10	OWNBY/UCFU	Dec-84	70.00	2,133	6525	78	259	2400	1.15
11	PRENTICE 6700/6700 CLFK	Dec-85	65.00	3,120	6700	84	700	2400	1.15
12	PRENTICE/NE	Sep-80	58.60	6,828	6700	73	696	2400	1.15
13	PRENTICE/SW	Jul-83	61.40	2,000	6450	100	370	2400	1.15
14	ROBERTSON/NORTH	Aug-80	70.00	4,696	5800	236	1300	2950	1.38
15	RUSSEL/7000 CFU	Oct-76	76.00	8,510	7350	101	307	2600	1.28
16	SMYER/EAST	Jan-85	67.00	4,410	5800	36	110	2100	1.08
17	SMYER/ELLWOOD "A"	Apr-83	80.00	4,320	5990	39	174	1858	1.06
18	WASSON 72/GAINES	Dec-84	73.00	4,400	5675	85	760	2600	1.25
19	WASSON 72/GIBSON	Jan-79	70.00	3,760	6600	169	725	2700	1.25
20	WASSON 72/SOUTH	May-84	74.00	4,961	6400	137	1255	2600	1.25
21	WASSON 72/YOAKUM	Dec-84	73.00	7,400	5675	37	336	2600	1.24
22	WASSON NE CF/NORTH	Dec-84	65.00	4,320	6400	81	234	2643	1.3
	MEAN	1982	69.45		5922	79			
	RANGE		58.-82.		3170-7350	32-236			

TABLE 3.2–Continued

	UNITS	API	SWI (%)	PERM (md)	POR (%)	VIS (cp)	PWS (acre/well)	WWS (acre/well)	IWS (acre/well)
1	DIAMOND M/JACK	30.50	40.00	8.00	7.00	2.40	64	36	19
2	DIAMOND M/McLA AC 1	30.50	38.00	3.00	7.00	2.40	65	40	22
3	DOLLARHIDE/'AB'	37.00	18.00	8.40	8.90	0.56	34	33	15
4	FLANAGAN/CLEARFORK CONS	32.20	24.90	5.20	11.40	1.65	52	46	44
5	FULLERTON	42.00	22.30	3.00	10.00	0.46	40	36	26
6	GLDSMTH 5600/CA GLDSMTH	38.00	31.00	28.00	15.00	0.70	33	23	19
7	GOLDSMTH/LANDRETH (2)	39.00	26.00	2.60	9.60	0.54	41	40	30
8	LEE HARRISON/WEST	25.00	42.00	4.00	12.50	8.70	77	48	35
9	NORTH RILEY"CF"	32.00	33.00	12.00	7.70	2.55	53	50	30
10	OWNBY/UCFU	27.00	30.00	1.20	5.00	1.68	51	50	31
11	PRENTICE 6700/6700 CLFK	29.00	35.00	7.70	7.00	1.80	43	42	33
12	PRENTICE/NE	28.00	41.40	3.00	8.20	1.68	53	49	25
13	PRENTICE/SW	28.00	38.60	3.00	6.20	1.74	40	29	16
14	ROBERTSON/NORTH	31.00	30.00	0.70	6.30	1.20	45	38	13
15	RUSSEL/7000 CFU	34.70	24.00	1.00	5.30	0.84	46	43	28
16	SMYER/EAST	26.50	33.00	3.40	8.30	5.79	85	44	33
17	SMYER/ELLWOOD "A"	25.00	20.00	5.00	8.30	5.10	40	32	28
18	WASSON 72/GAINES	35.00	27.00	1.00	6.40	1.00	42	41	32
19	WASSON 72/GIBSON	31.00	30.00	0.50	5.50	1.45	44	39	32
20	WASSON 72/SOUTH	32.00	26.00	5.50	7.70	1.40	41	29	27
21	WASSON 72/YOAKUM	35.00	27.00	0.50	6.40	1.00	81	57	51
22	WASSON NE CF/NORTH	30.00	35.00	0.20	5.10	1.50	53	45	37
	MEAN		30.55	4.86	7.95		51	40	28
	RANGE		20-40.4	0.2-28	5.0-15				

TABLE 3.2–Continued

	UNITS	OOIP (MSTB)	OIP-IIF (MSTB)	UPR (MSTB)	PR (%OOIP)	UWR (MSTB)	WR (%OOIP)	UIR (MSTB)	IR (%OOIP)	CO	INCOIL (MSTB)
1	DIAMOND M/JACK	3,000	2,469	365	12.17	545	18.17	770	25.67		225
2	DIAMOND M/McLA AC 1	6,504	5,960	513	7.88	653	10.04	865	13.29		212
3	DOLLARHIDE/'AB'	100,000	77,771	13,631	13.63	24,197	24.20	33,986	33.99	**	9789
4	FLANAGAN/CLEARFORK	83,000	12,553	12,553	15.12	26,659	32.12	28,589	34.45		1930
5	FULLERTON	1,029,000	883,947	140,766	13.68	186,435	18.12	284,996	27.70		98561
6	GLDSMTH 5600/CA GLDS	643,000	538,370	65,733	10.23	114,425	17.80	120,204	18.69		5779
7	GOLDSMTH/LANDRETH (	121,000	84,111	29,497	24.38	42,447	35.08	51,369	42.45		8922
8	LEE HARRISON/WEST	20,700	18,437	2,146	10.37	2,740	13.24	3,353	16.20		613
9	NORTH RILEY "CF"	39,500	35,218	4,013	10.16	7,044	17.83	9,026	22.85		1982
10	OWNBY/UCFU	152,706	133,138	19,189	12.57	23,671	15.50	36,209	23.71		12538
11	PRENTICE 6700/6700 CLFK	193,156	130,332	33,612	17.40	72,371	37.47	87,364	45.23		14993
12	PRENTICE/NE	193,156	130,185	33,612	17.40	77,609	40.18	95,066	49.22		17457
13	PRENTICE/SW	45,110	32,206	6,737	14.93	14,744	32.69	20,232	44.85		5488
14	ROBERTSON/NORTH	360,000	337,961	28,339	7.87	35,063	9.74	56,857	15.79		21794
15	RUSSEL/7000 CFU	210,000	171,549	39,639	18.88	52,099	24.81	58,455	27.84		6356
16	SMYER/EAST	62,723	55,022	5,223	8.33	13,850	22.08	16,378	26.11		2528
17	SMYER/ELLWOOD "A"	81,600	67,583	8,517	10.44	19,762	24.22	24,078	29.51		4316
18	WASSON 72/GAINES	146,000	128,089	17,954	12.30	21,445	14.69	23,180	15.88		1735
19	WASSON 72/GIBSON	151,989	139,584	13,062	8.59	14,677	9.66	20,398	13.42		5721
20	WASSON 72/SOUTH	240,000	192,303	41,327	17.22	56,948	23.73	61,616	25.67		4668
21	WASSON 72/YOAKUM	80,000	65,926	14,026	17.53	14,989	18.74	16,178	20.22		1189
22	WASSON NE CF/NORTH	68,901	58,938	10,224	14.84	12,770	18.53	14,392	20.89		1622
	TOTAL / MEAN	4,031,045		540,678	13.45	835,143	21.76	1,063,561	26.98		228418
	TOTAL excluding CO2 units	3,931,045		527,047		810,946		1,029,575			218629

NOTE: (**) Units with CO2 Flooding

TABLE 3.3–SAN ANDRES DATA BASE

	UNITS	NFILL DRILLE (Date Started)	SOI (%)	AREA (acres)	DEPTH (ft)	NET (ft)	GROSS (ft)	PRESS (psi)	FVF (RB/STB)
1	ADAIR "SA"	Apr-74	65.00	5,338	4,800	50	105	1,875	1.12
2	FUHRMAN MASCHO/BL10 "GBSA"	Sep-81	60.00	6,134	4,300	41	250	1,600	1.15
3	FUHRMAN MASCHO/BL9 "GBSA"	Feb-81	70.00	3,948	4,450	41	250	1,600	1.10
4	JOHNSON /"GB" "SA"	Jun-82	78.20	3,720	4,150	50	130	1,595	1.20
5	JOHNSON/ "AB" "SA"	Sep-79	70.00	840	4,100	60	148	2,500	1.20
6	LEVELLAND/N CEN UN "SA"	——	75.00	11,250	4,750	31	70	1,690	1.23
7	MABEE/JE MABEE 'A' "SA"	Oct-87	71.00	13,030	4,700	40	50	1,905	1.08
8	MEANS "SA"	——	71.20	14,328	4,300	55	300	1,850	1.04
9	OWNBY "SA"	Mar-82	61.90	2,960	5,200	32	85	1,800	1.35
10	OWNBY/BL GILSTRAP"SA"	Jan-82	62.00	160	5,235	40	85	1,800	1.20
11	SABLE "SA"	Apr-84	75.00	1,340	5,200	57	79	1,550	1.20
12	SEMINLE/"SA"	——	84.00	15,699	5,300	126	154	2,020	1.34
13	SHAFTER "SA"	Nov-81	75.00	11,080	4,300	55	200	1,865	1.25
14	SLAUGHTER/IGOE SMITH "SA"	——	85.90	2,124	4,930	49	120	1,710	1.23
15	TRIPLE-N "GB"	Feb-82	60.00	2,040	4,325	20	20	2,129	1.23
16	WASSON/BENNET "SA"	Jan 77	73.00	7,027	5,100	130	865	1,805	1.31
17	WASSON/CORNELL "SA"	Mar-80	85.00	1,923	4,900	220	305	1,850	1.30
18	WASSON/DENVER "SA"	——	85.00	25,505	4,800	141	290	1,805	1.31
19	WASSON/REBORTS "SA"	Feb-79	85.00	13,575	4,900	68	255	1,805	1.31
20	WASSON/WILLARD "SA"	Jan-84	80.00	13,360	5,100	130	200	1,805	1.31
21	WEST SEMINOLE "SA"	Mar-79	82.00	3,640	5,112	118	210	2,020	1.38
	MEAN	1980	74.01	7572	4760	74			
	RANGE		60-85		4100-5235	20-220			

TABLE 3.3–Continued

	UNITS	API	SWI (%)	PERM (md)	POR (%)	VIS (cp)	PWS (acre/well)	WWS (acre/well)	IWS (acre/well)
1	ADAIR "SA"	33.50	35.00	3.70	14.10	1.60	49	41	30
2	FUHRMAN MASCHO/BL10 "GBSA"	31.00	40.00	2.40	7.70	3.50	57	52	46
3	FUHRMAN MASCHO/BL9 "GBSA"	29.00	30.00	4.00	7.00	3.30	51	29	25
4	JOHNSON /"GB" "SA"	32.50	21.80	5.30	6.70	3.64	45	32	25
5	JOHNSON/"AB" "SA"	38.80	30.00	1.80	8.00	1.27	56	22	9
6	LEVELLAND/N CEN UN "SA"	31.00	25.00	1.80	8.00	2.45	42	31	23
7	MABEE/JE MABEE 'A' "SA"	32.00	29.00	1.50	10.50	2.38	45	22	21
8	MEANS "SA"	29.30	28.80	29.00	9.00	6.20	48	36	19
9	OWNBY "SA"	32.00	38.10	4.50	14.10	1.52	60	50	41
10	OWNBY/BL GILSTRAP "SA"	31.00	38.00	4.50	14.20	2.00	40	32	20
11	SABLE "SA"	32.00	25.00	1.50	9.00	2.20	36	21	19
12	SEMINLE/"SA"	35.00	16.00	31.20	12.00	1.07	48	30	26
13	SHAFTER "SA"	32.00	25.00	5.00	6.50	1.34	43	34	30
14	SLAUGHTER/IGOE SMITH "SA"	32.00	14.10	5.00	11.20	1.38	51	26	22
15	TRIPLE-N "GB"	31.90	40.00	6.60	12.10	1.82	89	51	28
16	WASSON/BENNET "SA"	33.00	27.00	1.70	10.00	1.55	33	24	15
17	WASSON/CORNELL "SA"	33.00	15.00	3.70	8.50	1.25	27	21	15
18	WASSON/DENVER "SA"	33.00	15.00	5.00	12.00	1.81	66	43	18
19	WASSON/REBORTS "SA"	33.00	15.00	5.00	8.50	1.57	70	36	32
20	WASSON/WILLARD "SA"	32.00	20.00	1.50	8.50	1.80	60	44	29
21	WEST SEMINOLE "SA"	32.40	18.00	20.80	9.90	0.98	56	39	24
	MEAN		25.99	6.93	9.88		51	34	25
	RANGE		14.1-40	1.5-31.2	6.5-14.2				

TABLE 3.3 – Continued

	UNITS	OOIP (MSTB)	OIP-IIF (MSTB)	UPR (MSTB)	PR %(OOIP)	UWR (MSTB)	WR (% OOIP)	UIR (MSTB)	IR (% OOIP)	CO2	INCOIL (MSTB)
1	ADAIR "SA"	168000	147111	26,258	15.63	36,109	21.49	57,818	34.42		21709
2	FUHRMAN MASCHO/BL10 "G	79000	69970	8,192	10.37	9,673	12.24	10,356	13.11		682
3	FUHRMAN MASCHO/BL9 "GB	55939	48258	6,506	11.63	7,875	14.08	10,427	18.64		2552
4	JOHNSON /"GB" "SA"	80000	66361	9,867	12.33	14,363	17.95	17,531	21.91		3168
5	JOHNSON/ "AB" "SA"	19600	17023	1,601	8.17	3,727	19.02	5,433	27.72		1706
6	LEVELLAND/N CEN UN "SA"	133000	108718	19,298	14.51	33,635	25.29	56,458	42.45	**	22823
7	MABEE/JE MABEE 'A' "SA"	432000	358144	40,970	9.48	90,592	20.97	100,536	23.27		9944
8	MEANS "SA"	382000	286906	56,154	14.70	123,812	32.41	157,012	41.10	**	33200
9	OWNBY "SA"	52500	45855	7,665	14.60	9,855	18.77	15,493	29.51		5639
10	OWNBY/BL GILSTRAP "SA"	3240	2521	403	12.44	1,182	36.49	1,468	45.30		285
11	SABLE "SA"	22700	15523	4,497	19.81	8,969	39.51	10,494	46.23		1526
12	SEMINOLE/"SA"	1050000	660985	197,570	18.82	447,003	42.57	536,158	51.06	**	89125
13	SHAFTER "SA"	165000	135293	23,067	13.98	31,368	19.01	34,261	20.76		2893
14	SLAUGHTER/IGOE SMITH "S	63200	47003	9,373	14.83	24,733	39.13	28,969	45.84	**	4236
15	TRIPLE-N "GB"	27100	22793	2,749	10.14	5,011	18.49	6,804	24.11		1793
16	WASSON/BENNET "SA"	396000	331302	32,591	8.23	102,823	25.97	129,942	32.81		27119
17	WASSON/CORNELL "SA"	185000	138336	22,308	12.06	63,681	34.42	67,250	36.31		3569
18	WASSON/DENVER "SA"	2166000	1857455	268,584	12.40	443,468	20.47	1,002,455	46.28	**	558986
19	WASSON/ROBERTS "SA"	342400	260008	46,078	13.46	100,366	29.31	109,173	31.88		8807
20	WASSON/WILLARD "SA"	624000	548401	45,552	7.30	110,755	17.75	180,501	28.93		69746
21	WEST SEMINOLE "SA"	172000	149587	12,719	7.39	30,992	18.02	44,117	25.65		131124
	TOTAL / MEAN	6618679		842,002	12.49	1,699,992	24.92	2,582,656	30.30		882,664
	TOTAL EXCLUDING CO2 UNI	2824479		291,023		627,341		801,604			174,263

NOTE: (**) Units with CO2 flooding

TABLE 3.4–BEG ATLAS OF MAJOR TEXAS OIL RESERVOIRS (CLEARFORK)
(Clearfork Carbonates)

FIELD AND RESERVOIR	DEPTH (feet)	POR (%)	PERM (md)	SWI (%)	PROD TECH	WELL SPACING	SOR (%)	OOIP (MMBBL)	REC EFF (%)	CUM PROD (MMBBL)	ULT RECVRY (MMBBL)
CLEARFORK PLATFORM CARBONATES											
COWDEN NORTH DP	5100	8	7	20	WF	40	30	176	26	41.2	46.6
DOLLARHIDE CLRFK	6500	18	10	25	WF	40	44	102	31	30.7	32.1
FLANAGAN U. CLFK	6300	13	3	27	WF-CO2	40	25	100	23	19.5	23
FULLERTON	7000	10	3	24	WF-PMW	30	23	1135	20	211.2	230.9
GOLDSMITH CLFK	6100	12	5	25	WF	40	30	295	21	58.5	60.6
GOLDSMITH 5600	5600	15	25	30	WF-PMW	40	23	768	28	203.6	216
HARRIS	5900	9	11	28	WF	40	35	148	29	36	43.3
KEYSTONE HOLT	4800	18	58	29	WF	30	40	222	18	35.9	38.9
RILEY N. U. CLFK	6300	8	12	33	WF	40	35	106	19	18.8	19.7
ROBERTSON N. CLFK	7100	7	19	27	WF	30	35	640	10	53.3	67
SAND HILLS TUBB	4500	12	30	40	WF-PMW	30	31	468	20	81.1	92.2
TXL TUBB	6200	9	1	38	WF	40	30	191	20	35	38.2
UNION	6900	11	2	15	PMW	40	30	98	16	15.1	15.7
CLEARFORK CARBONATE (NORTHERN SHELF PERMIAN)											
OWNBY	6900	9	4	17	WF	80	58	113	11	11	12.6
PRENTICE 6700	6700	6	2	31	WF	30	24	210	47	78.3	98.2
PRENTICE	6000	12	12	36	WF	40	34	188	29	44.8	54.9
RUSSELL 7000 CLFK	7000	5	2	25	WF	40	40	229	24	45.7	55.8
SMYER	5900	9	8	40	WF	40	19	92	39	29.2	35.8
WASSON N.E.	7800	5	9	30		40	30	25	46	10.4	11.4
WASSON 6600&7200	6900	8	10	24		40	30	291	28	76.8	82.6
TOTAL/MEAN	6275	10	12	28		40	32	5597		1136.1	1275.5
RANGE		5.-18	1.-58	15-40			23-44				

TABLE 3.5–BEG ATLAS OF MAJOR TEXAS OIL RESERVOIRS (SAN ANDRES)

(San Andres Carbonates)

FIELD AND RESERVOIR	DEPTH (feet)	POR (%)	PERM (md)	SWI (%)	PROD TECH	WELL SPACING	SOR (%)	OOIP (MMBBL)	REC EFF (%)	CUM PROD (MMBBL)	ULT RCVRY (MMBBL)
SAN ANDRES/GRAYBURG CARBONATES											
BIG LAKE	3000	19	20	20		5		277	49	126	135
FARMER	2200	10	4	26		30	45	138	11	9.9	15
OLSON	1800	12	28	35	WF	20	21	61	23	12.5	14
SANNON SAN AND.	2400	10	24	33	WF	30	26	85	12	9.9	10.6
VAUGHN	1500	14	10	35	WF	10	30	61	20	11.2	12
WORLD	2600	15	8	30	WF	20	20	215	20	40.4	43.1
SAN ANDRES/GRAYBURG CARBONATE (SOUTH CENTRAL BASIN PLATFORM)											
COWDEN NORTH	4300	10	7	29	WF-PMW/G	40	35	1064	37	340.4	397
COWDEN SOUTH	4600	12	3	26	WF	40	31	570	28	128.2	162.4
C-BAR	3500	8	5	35	WF	30	25	59	32	16.5	19
DUNE	3300	10	6	25	WF-PMW/G	15	27	590	28	149.4	163.9
FOSTER	4300	10	7	23	WF-PMW	40	32	785	29	220.1	228.8
GOLDSMITH NRTH	4400	8	2	25	WF	40	35	45	33	12.4	15
GOLDSMITH	4100	11	12	15	WF-PMG	20	33	990	35	323.2	343
HARPER	4100	10	2	35	WF	20	33	168	27	40	45
JOHNSON	4100	7	5	22	WF	40	35	135	20	23.8	26.6
JORDAN	3500	15	20	25	WF-PMW	20	30	225	42	76.8	93.4
LARSON	4300	10	6	30	PMW	40	35	55	26	13.8	14.1
MABEE	4700	11	8	29	WF	20	21	290	32	67.5	93
MC CAMEY	2200	14	18	30	WF	10	30	463	28	129.1	129.9
MC ELROY	2900	16	50	20	WF	30	25	2544	20	411	510

TABLE 3.5– Continued

(San Andres Carbonates)

FIELD AND RESERVOIR	DEPTH (feet)	POR (%)	PERM (md)	SWI (%)	PROD TECH	WELL SPACING	SOR (%)	OOIP (MMBBL)	REC EFF (%)	CUM PROD (MMBBL)	ULT RCVRY (MMBBL)
MIDLAND FARMS N.	4800	12	6	19	WF	40	22	51	30	14	15.2
MIDLAND FARMS	4800	14	61	20	WF	40	25	775	20	120.7	154.6
PENWELL	3600	10	3	35	WF	20	35	329	23	69.3	74.6
SAND HILLS McKNT	3500	9	1	40	WF	30	40	705	18	108.8	128.6
WADDELL	3500	11	12	40	PMW	20	36	443	22	92.5	97.5
SAN ANDRES/GRAYBURG CARBONATE (NORTH CENTRAL BASIN PLATFORM)											
EMMA	4000	7	11	20	WF	30	23	63	30	18.6	18.8
FUHRMANN MSCHO	4300	13	5	30	WF-PMW	40	15	330	27	87.2	89.1
MEANS	4400	9	20	29	WF	20	30	449	37	138.4	164.7
SEMINOLE WEST	5100	10	9	18	WF-PMG	40	35	172	28	31.9	49
SEMINOLE	5200	13	25	12	PMW-PMG	20	27	1150	41	344.2	470
SHAFTER JAKE S.A.		8	5	25	WF	40	30	236	17	35.3	40.1
SAN ANDRES/GRAYBURG CARBONATE (NORTHERN SHELF PERMIAN)											
ADAIR	4800	12	4	27	WF	40	37	168	40	46.5	67.2
LEVELLAND	4900	11	2	26	WF-PMG/M	40	47	1012	41	349.9	413.7
SLAUGHTER	5000	12	11	20	WF-PMW/G	35	34	2806	43	857.5	1216.1
WASSON	4900	10	4	20	WF-PMG	30	40	4400	37	1308.4	1629
TOTAL/MEAN	3731	11	12	27		29	30	21909	29	5785.3	7099
RANGE	1500-5000	7.-13	1.-50	12.-40			15-47				

TABLE 3.6–SUMMARY OF RESERVOIR PROPERTIES FROM ALL THREE RESOURCES

PARAMETERS	IORC SAN ANDRES	IORC CLEARFORK	BEG ATLAS SAN ANDRES	BEG ATLAS CLEARFORK	BEG CIRC SAN ANDRES	BEG CIRC CLEARFORK
NUMBER OF UNITS	21	22	35	20	ALL	ALL
OOIP (MMSTB)	2825	3931	21909	5597	53910	24600
MEAN DEPTH (feet)	4760	5922	3731	6275		
RANGE	4100 - 5235	3170 - 7350	1500-5000	5100-7800		
WELL SPACING	25	28	29	40		
RANGE	9.-46	13-51	5.-40	30-80		
MEAN POR (%)	9.88	7.95	11	10		
RANGE	6.5 -14.2	5. -15.	7.-13	5.-18		
MEAN SOI (%)	74.01	69.45	73	72		
RANGE	60 - 85	58 - 82	60-88	60-85		
MEAN PERM (md)	6.93	4.86	12	12		
RANGE	1.5 - 31.2	.2 - 28	1.-50	1.-58		
CUM PROD (MMSTB)	* 789	* 882	** 5785.3	** 1136.1	*** 14110	*** 3244
OOIP (%)	* 27.94	* 21.88	** 26.41	** 20.03	*** 26.17	*** 13.19
REMAINING OOIP	13	148	1313.7	139.4	3290	756
REMNG OOIP (%)	0.45	4.32	1.98	6.17	2.22	13.01
ULT RCVY (MMSTB)						
PRIMARY	291	527				
WATERFLOOD	627	811				
INFILL DRILLING	802	1030	7099	1275.5	17400	4000
INCOIL	174	219			(3445)	(1245)
ULT RCYY/OOIP (%)						
WATERFLOOD	22.2	20.06				
INFILL DRILLING	28.39	26.2		22.79		16.26
EOR			32.4		32.28	
INCOIL/OOIP	6.39	5.06			(6.39)	(5.06)

NOTE: (*) Prod. Data Up To 1991 (**) Prod. Data Up To 1983 (***) Prod. Data Up To 1985

( ) Extrapolated from the IORC database incremental infill drilling oil recoveries

TABLE 3.7–AVERAGE WELLHEAD OIL PRICE FOR TEXAS OILS
($ Per Barrel)

YEAR	PRICE
1981	$35.06
1982	$31.77
1983	$29.35
1984	$28.87
1985	$26.80
1986	$14.73
1987	$17.55
1988	$14.71
1989	$17.68
1990	$22.36
1991	$19.04
AVERAGE	$23.45

CHAPTER IV

THE AMOUNT OF REVENUE FROM OIL PRODUCTION

4.1 General Description

The next step in this economic analysis is to find out how much revenue is generated from the aforementioned infill drilling recovery. This analysis is conducted using the San Andres and Clearfork infill drilling projects in the previous chapter. The results are extrapolated to account for the rest of the Clearfork and San Andres reservoirs in the Permian Basin.

4.2 Basic Assumptions

The following major assumptions are made using the computer program PROPHET, provided by Energy Software International (ENSYTE).[17] The first assumption is that the average water injection to oil production ratio (WIOPR) is used instead of the actual monthly water injection for the years beyond 1991. Before 1991, the actual water injection rates are used. The WIOPR is defined as the average amount of water injection required for producing one barrel of oil over the life of the infill drilling project. The monthly water injection beyond 1991 is computed by the product of the monthly oil production rate from the decline curve analysis multiplied by the WIOPR.

The second assumption is the incremental oil and gas production data used to calculate the monthly gas production beyond 1991. The gas to oil ratio (GOR) is calculated by dividing the total gas produced from the start of infill drilling by the total oil produced during the infill drilling period. Then, take that GOR and multiply it by the incremental infill oil recovery for each year to find the incremental gas production for the years beyond 1991.[17] Incremental gas production will only be used in the IORC

data base units economic analysis and will not be extrapolated for the Clearfork and San Andres reservoirs in the Permian Basin.

The following minor assumptions are also used in the economic evaluation. First, the evaluation for infill drilling over continuing waterflood operations start at the inception of the infill drilling. The royalty is 12.5%, the cost of injected water is $0.20 per barrel and the oil and gas prices are assumed to be constant over the project life. The infill drilling costs are allocated for each year when drilled but the well workover costs are expensed at the start of infill drilling. Also, all economic indicators are evaluated before and after federal income tax. The drilling & completion costs, conversion costs, production and injection equipment costs, operating and maintenance costs, and workover costs are from the DOE Technical Report[1] and modified by a factor of 1.25 - 1.5. Some of these factors are tabulated in Table on p.39.. Furthermore, the drilling and completion costs, and the production and injection equipment costs are 30% tangible and 70% intangible. Finally, the combined state and local tax for oil is 4.6% of gross revenue and for gas it is 7.5% and the current federal income tax laws are applied for the duration of the projects.[16]

The net present value (NPV), discounted cash flow rate of return (DCFROR), and discounted profit to investment ratio (DPI) are used to evaluate the economics of infill drilling. However, the payout is not used for evaluation because all investments are not expensed up front at the beginning of each project.[16]

4.3 Revenue From Incremental Infill Drilling Production

Table on p.39 explains the parameters used in the tables to follow. The results of the IORC data base units economic analysis are shown in Tables on p.40 through p.45. Three oil prices ($18.00, $20.00 and $22.00 per barrel) and two values of WIOPR (8 & 10) are used to evaluate the economics of all 37 infill drilling projects. In this study, the profitability is defined as a positive

net present value at a 15% discount rate. For comparison, Shell Oil Corporation's goal is 12 percent return on their investment.[21] The IORC data base units which have undergone CO2 flood are not used in the analysis due to the high tertiary recovery rate. Based on this assumption, the results are presented and discussed in four cases classified according to the reservoir, oil price and the value of WIOPR.

Table on p.40 shows the Clearfork units with the WIOPR of 8. When the oil price is $18.00/BBL and the gas price is $1.80/MSCF, thirteen infill drilling projects are profitable. When the oil price is $20.00/bbl and gas price is $2.00/MSCF fourteen projects are profitable. When the oil price is $22.00/BBL and the gas price is $2.00/MSCF 18 projects are profitable.

Table on p.41 shows the Clearfork units with the WIOPR of 10. When the oil price is $18.00/BBL and the gas price is $1.80/MSCF, thirteen infill drilling projects are profitable. When the oil price is $20.00/bbl and gas price is $2.00/MSCF fourteen projects are profitable. When the oil price is $22.00/BBL and the gas price is $2.00/MSCF 18 projects are profitable.

Table on p.42 shows the San Andres units with the WIOPR of 8. When the oil price is $18.00/BBL and the gas price is $1.80/MSCF, thirteen infill drilling projects are profitable. When the oil price is $20.00/BBL and gas price is $2.00/MSCF fifteen projects are profitable. When the oil price is $22.00/BBL and gas price is $2.00/MSCF all 16 projects are profitable.

Table on p.45 shows the San Andres units with the WIOPR of 10. When the oil price is $18.00/BBL and the gas price is $1.80/MSCF, thirteen infill drilling projects are profitable. When the oil price is $20.00/BBL and gas price is $2.00/MSCF fourteen projects are profitable. When the oil price is $22.00/BBL and gas price is $2.00/MSCF all projects are profitable.

4.4 Extrapolating Out to the Entire San Andres and Clearfork Reservoirs in the Permian Basin

The IORC data base units economic evaluation is now extrapolated to all the Permian Basin's Clearfork and San Andres reservoirs. Table on p.48 combines all the Clearfork IORC data base units to compute the combined incremental infill drilling production per year. As shown in Tables on p.18 and p.21, all the infill drilling projects were started at about 1981 so the beginning of all the projects were started at time zero before they were added together. This procedure is performed in this way in order to create a typical profile of an infill drilling project in the Clearfork or San Andres reservoirs as shown in Fig. on p.35 through p.38. Table on p.48 also shows how long the overall combined infill drilling projects will last. The Clearfork projects for example, will last 36 years. Then, the percentage of the total infill drilling production per year is computed. This percentage of the total infill drilling recovery per year will be used to extrapolate 36 years to find the yearly infill drilling production for the entire Clearfork reservoir in the Permian Basin as shown in Table on p.58. When this infill drilling production is extrapolated, the production is adjusted depending on how many infill drilling projects are economical at that oil price. For example, as shown in Table on p.48, only 14 out of 21 infill drilling projects are profitable at $18.00/BBL producing 195 MMSTB. This production is compared to the total possible infill drilling recovery of 219 MMSTB, at the bottom of Table on p.27 in the previous chapter, and then compute a multiplier of 89.02%. This multiplier assumes that only 89.02% of the possible 219 MMSTB infill drilling recovery is profitable at $18.00/BBL as shown at the bottom of Table on p.58. Next, the yearly production is multiplied by $18.00/BBL for the IORC projects and the Clearfork reservoirs in the Permian Basin as also shown in Table on p.58.

Tables on p.52 and p.62 shows the same procedure for the San Andres infill drilling projects. The combined IORC San Andres units will last 48 years. The yearly production and revenue for the IORC data base units and all the Permian Basin San Andres reservoirs are calculated to 48 years as shown in Table on p.62.

For the IORC data base units, Fig. on p.35 shows the incremental production versus years for $18.00/BBL, $20.00/BBL, and $22.00/BBL and Fig. on p.36 shows generated revenue versus years for all three oil prices as well. The curves in these profiles should be smooth but they have some anomalies and rough spots due to moving large amounts of data from one large data base to another. For the Clearfork and San Andres reservoirs in the Permian Basin, Fig. on p.37 shows the incremental production versus years for $18.00/BBL, $20.00/BBL, and $22.00/BBL and Fig. on p.38 shows generated revenue versus years for all three oil prices. Notice that when the oil prices increase, more oil is economically recoverable. To find the results of other oil prices not listed above, the curves can be extrapolated proportionally up or down to determine the reserve recovery or revenue for the other oil prices. Also, the total revenues increase at each rise in the price of oil per barrel due to higher oil recovery and higher oil sales price. In 1994, for every $1.00 change in the average price of oil, the infill drilling incremental oil production changes approximately 3 million barrels of oil a year or 8,400 bbl/day, roughly 0.4% of the total oil production from Texas. The State of Texas produces 1.9 million barrels of oil per day.

4.5 Percent of Federal Income Tax

Tables on p.42 and p.45 show the percent of federal income tax collected from the IORC San Andres infill drilling project. After analyzing the data, a mean of 45% is used to find out how much federal tax is paid for the IORC data base Clearfork infill drilling projects as shown in Tables on p.40 and p.41. The total federal taxes paid for all the IORC data base Clearfork and San

Andres infill drilling projects are directly read from Table on p.40 through p.45 Taxes are further discussed in Chapter VI. This percentage is used in Chapter VI to compute the taxes generated from all the San Andres and Clearfork reservoirs in the Permian Basin.

4.6 Rule of Thumb in Computing Revenue

The U.S. Department of Commerce, Economic Development Agency uses a rule of thumb to calculate how much revenue will be generated from investments in the communities. For every outside dollar that is introduced into the local economy 7 additional dollars will be generated. An outside dollar for example is like a tourist dollar. Another rule of thumb is from the Center for Energy and Economic Diversification at the University of Texas at the Permian Basin. They use a rule of thumb that every dollar introduced in the community which was earned in the community will generates 3 additional dollars for the same community. This rule of thumb applies to the oil companies because the table in appendix B shows that for every 1 oil field worker, 3 secondary jobs are created in the local community or three additional paychecks from one paycheck. See Fig. 4.1 through 4.4 and Tables 4.1 through 4.10 as follows.

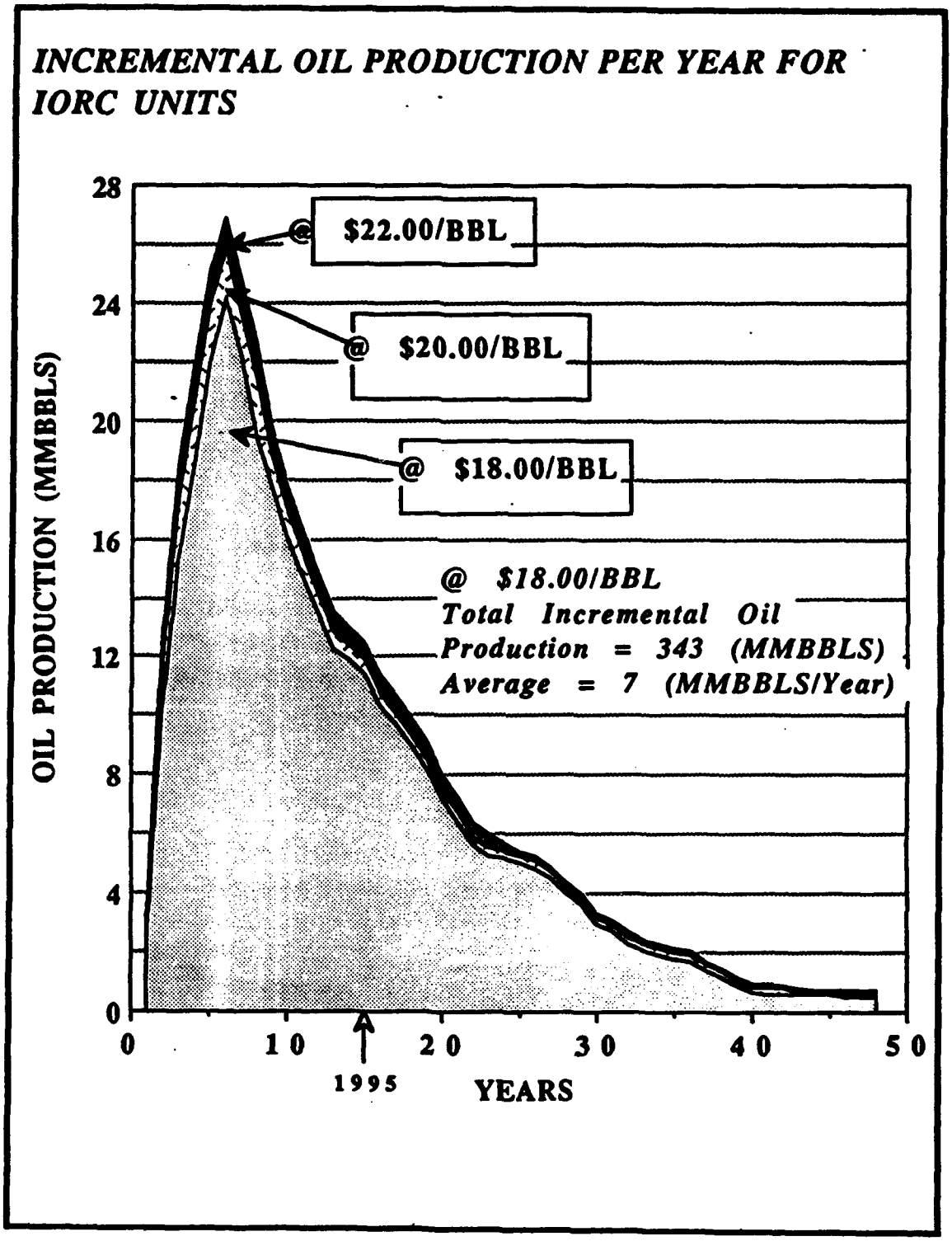

Fig. 4.1–Combined incremental oil production per year for IORC Clearfork and San Andres units.

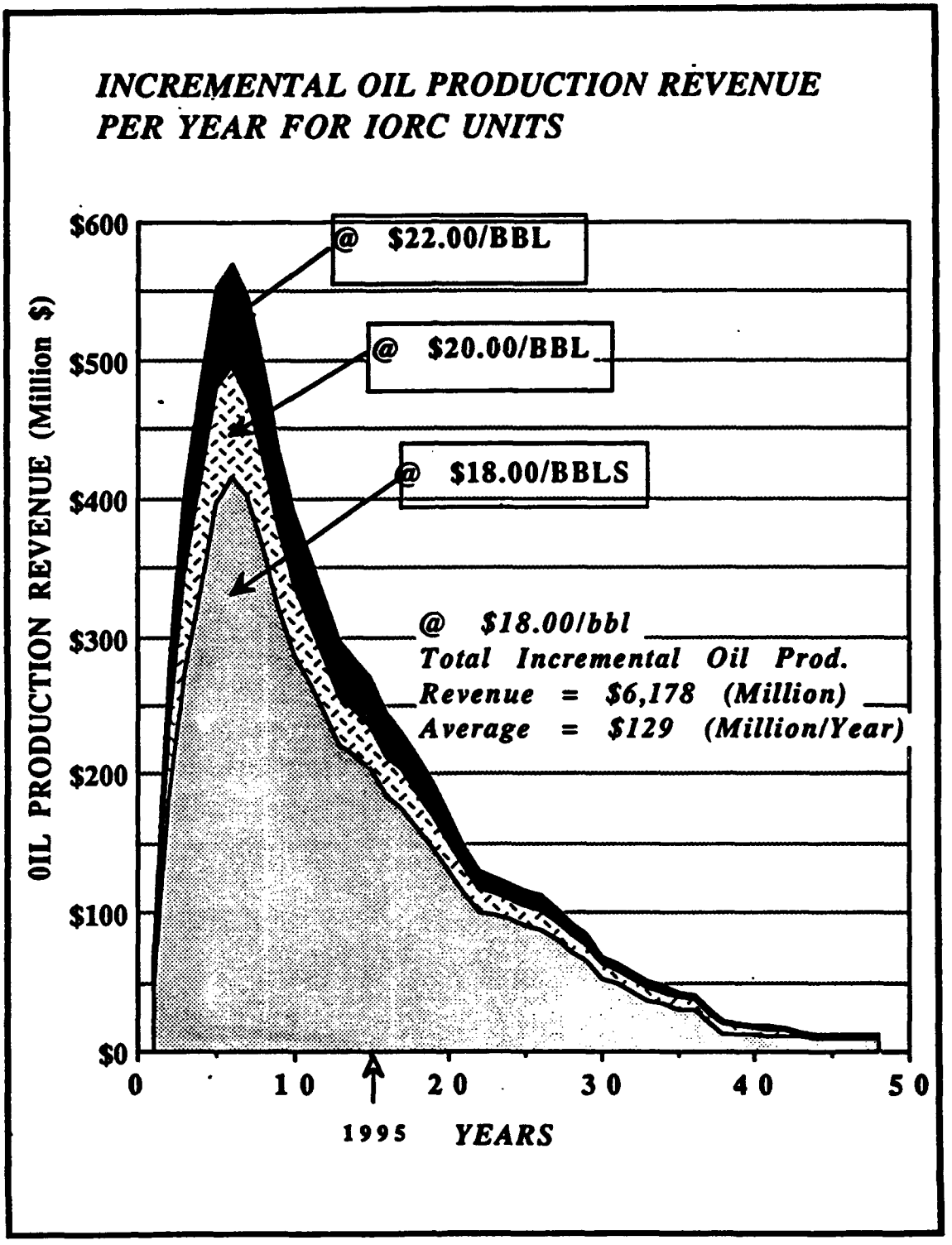

Fig. 4.2—Combined incremental oil production revenue per year for IORC Clearfork and San Andres units.

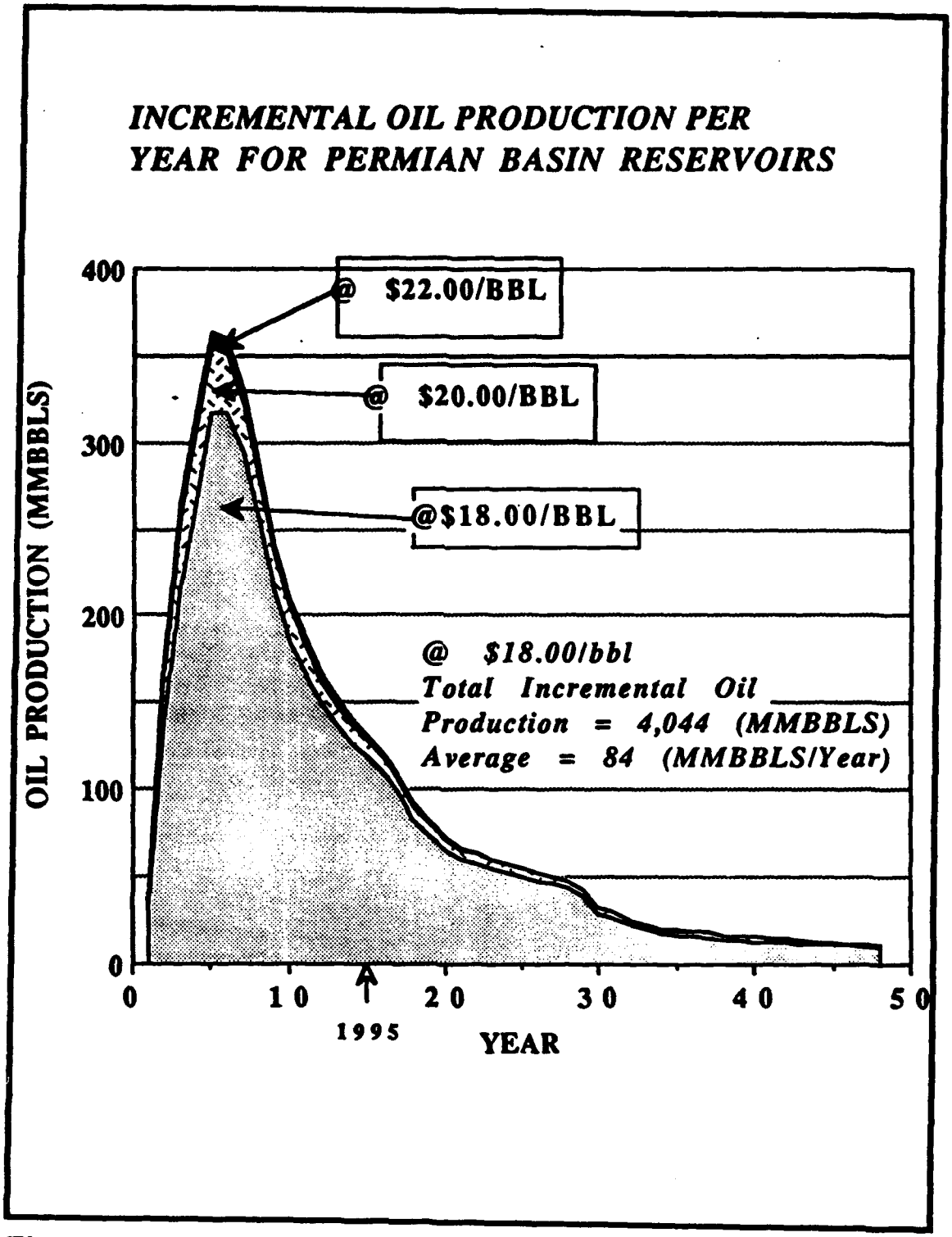

Fig. 4.3–Combined incremental oil production per year for all Permian Basin Clearfork and San Andres reservoirs.

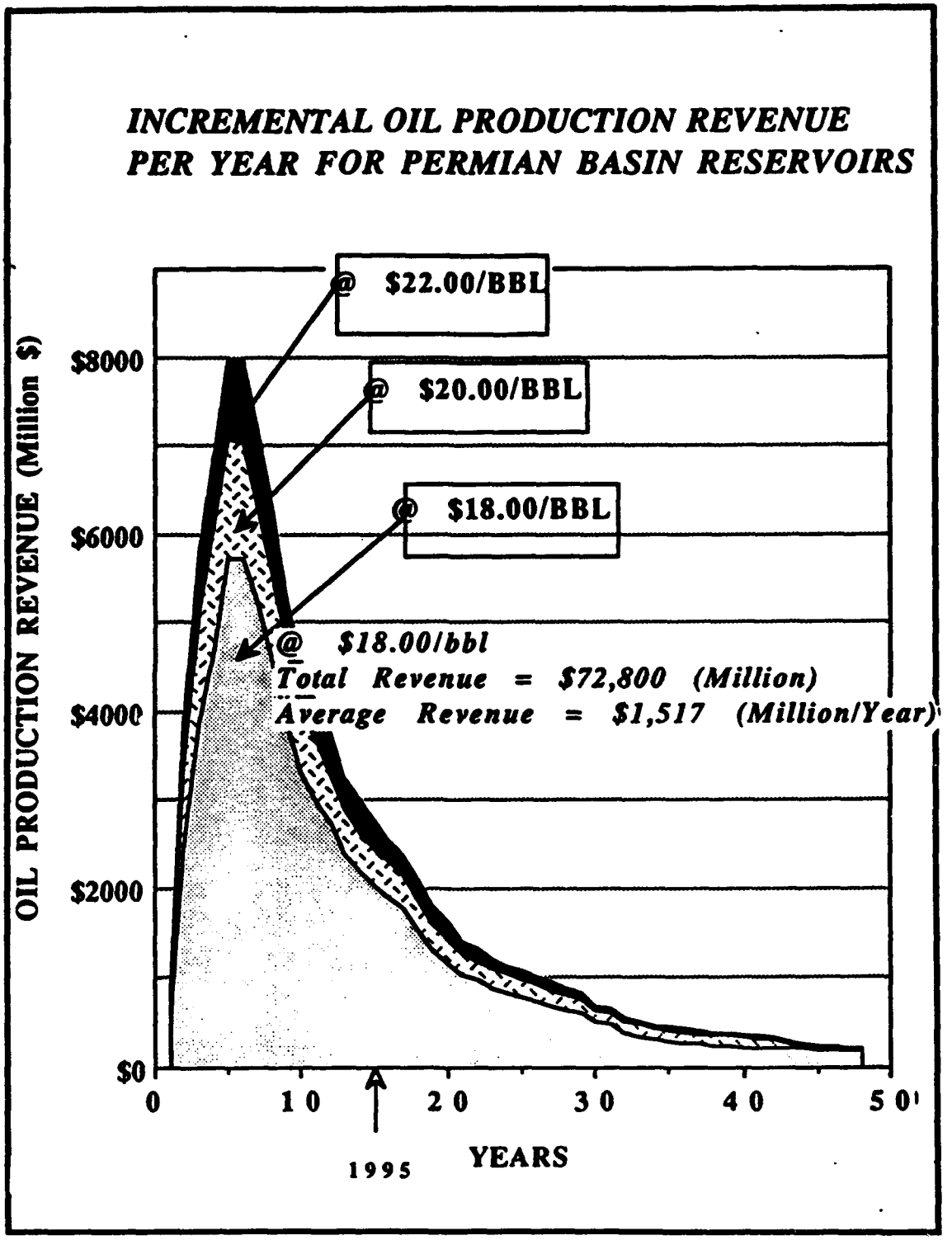

Fig. 4.4—Combined incremental oil production revenue per year for all Permian Basin Clearfork and San Andres reservoirs.

TABLE 4.1–PARAMETERS USED IN TABLES

ABBR.	DEFINITION
DCFROR	Discounted cash flow rate of return
DPI	Discounted profit to investment ratio
CO2	Injected with carbon dioxide
EXCL	Projects excluded from calculation
FED TAX	Federal income tax.
INFINITY	A DCFROR greater than 1,000.
LIFE	Life of the Project.
NPV	Net present value
NPV BEFORE TAXES	NPV computed before federal income tax
NPV AFTER TAXES	NPV computed after federal income tax
NPV DIFF.	NPV before taxes minus NPV after taxes
NPV DIFF. %	NPV Diff. divided by NPV before taxes
TOT RCVY	Total amount of oil recovered in the project
TOTAL OIL RCVY	The sum of oil recovered for that period.
% OF TOTAL RCVY	TOTAL OIL RCVY/TOT RCVY.
TOTAL REVENUE	TOTAL OIL RCVY*OIL PRICE

TABLE 4.2–THE ESTIMATE OF COSTS

INTERVAL OF DEPTH (ft)		DRILLING COSTS (M$/well)	WORKOVER COST (M$/well)	OPERATING COSTS (M$/well/year)
4100-4500	produce	297.598	14.535	11.916
(Avg.4275)	Injector	280.564		
4600-4900	Producer	344.955	17.086	12.688
(Avg. 4826)	Injector	325.092		
5100-5350	Produce	379.852	18.969	13.208
(Avg. 5178)	Injector	358.027		

TABLE 4.3--SUMMARY OF THE ECONOMIC EVALUATION FOR IORC CLEARFORK UNITS (8)

(Water Injected/Oil : 8)

	UNIT	CO2 EXCL	LIFE (year)	(Oil Price: $18/BBL) NPV @15% (M$)	DCFROR (%)	DPI	(Oil Price: $20/BBL) NPV @15% (M$)	DCFROR (%)	DPI	(Oil Price: $22/BBL) NPV @15% (M$)	DCFROR (%)	DPI
1	Diamond M Jack	(***)	12.58	-233.30	6.80	-0.19	-138.51	10.30	-0.11	-45.46	13.50	-0.04
2	Diamond McLA AC1	(*)	11.17	-216.98	8.20	-0.09	3.20	15.10	0.00	217.63	22.10	0.09
3	Dollarhide/"AB"	CO2	23.17	5,930.20	27.50	0.30	8,605.74	33.40	0.43	11,089.95	39.20	0.56
4	Flanagan/CLF CONS		26.83	3,298.30	123.10	2.16	3,860.37	141.60	2.52	4,407.57	160.30	2.88
5	Fullerton		36.00	62,869.67	Infinity	0.87	77,543.76	Infinity	1.07	91,317.67	Infinity	1.26
6	Goldsmth 5600/CA	(***)	12.92	-12,179.55	1.40	-0.28	-9,497.53	4.50	-0.22	-7,114.86	7.10	-0.16
7	Goldsmth/Landreth(2)		23.33	2,370.64	17.70	0.12	4,523.62	20.00	0.24	6,438.55	21.90	0.34
8	Lee Harrison/West		19.92	69.62	16.50	0.04	234.17	20.10	0.15	396.94	23.70	0.25
9	North Riley "CF"		18.67	10,425.95	29.80	0.31	15,060.95	36.70	0.44	19,453.13	43.50	0.57
10	Ownby CLF	(**)	20.58	-1,643.25	6.50	-0.15	-728.49	11.20	-0.07	167.11	15.90	0.02
11	Prentice 6700		27.58	21,084.99	107.30	1.30	25,341.11	infinity	1.56	29,530.75	infinity	1.82
12	Prentice NE		26.67	10,260.00	29.60	0.26	15,426.81	37.30	0.39	20,490.03	45.00	0.51
13	Prentice SW		16.58	3,650.44	26.50	0.19	5,988.96	34.50	0.31	8,275.20	43.10	0.43
14	Robertson/North		23.00	33,832.72	51.00	0.98	41,366.93	60.30	1.20	48,579.59	70.00	1.41
15	Russel/7000 CFU	(**)	22.25	-4,031.40	4.20	-0.13	-1,678.12	9.70	-0.05	594.44	17.50	0.02
16	Smyer/East	(**)	17.75	-1,777.41	9.30	-0.15	-811.73	12.40	-0.07	148.52	15.50	0.01
17	Smyer Ellwood"A"		19.50	5,085.72	418.60	0.76	6,359.75	505.00	0.96	7,623.24	599.80	1.15
18	Wasson 72/Gaines	(***)	15.42	-1,721.78	5.40	-0.17	-880.58	9.90	-0.09	-60.64	-0.01	0.27
19	Wasson 72/Gibson		18.33	10,408.73	58.50	1.26	12,501.36	68.30	1.51	14,514.42	78.40	1.76
20	Wasson 72/South		13.75	17,981.65	563.10	8.21	20,454.67	658.00	9.34	22,854.85	752.30	10.44
21	Wasson 72/Yoakum		10.00	299.84	17.00	0.06	899.16	20.90	0.17	1,480.00	24.50	0.28
22	Waason NE CF/North	(**)	14.50	-1,496.16	8.60	-0.17	-747.56	11.80	-0.09	-12.04	14.90	0.00
	TOTAL			181,638.26			229,564.81			276,489.61		
	FED TAX=TOTAL*44.83%			153,230.04			193,660.87			233,246.64		

(CO2) EXCLUDED FROM ANALYSIS *(***) EXCLUDED, NOT PROFITABLE @ 15% DISCOUNT RATE*

TABLE 4.4--SUMMARY OF THE ECONOMIC EVALUATION FOR IORC CLEARFORK UNITS (10)

(Water Injected /Oil : 10)

	UNITS	CO2 EXCL	LIFE (year)	(Oil Price: $18/BBL) NPV @15% (MS)	DCFROR (%)	DPI	(Oil Price: $20/BBL) NPV @15% (MS)	DCFROR (%)	DPI	(Oil Price: $22/BBL) NPV @15% (MS)	DCFROR (%)	DPI
1	Diamond M Jack	(***)	12.58	-256.62	5.90	-0.21	-161.82	9.50	-0.13	-68.77	12.70	-0.06
2	Diamond McLA AC1	(*)	11.17	-270.72	6.50	-0.11	-50.54	13.40	-0.02	163.90	20.30	0.07
3	Dollarhide/"AB"	CO2	23.17	5,307.71	26.20	0.27	7,983.25	32.00	0.40	10,467.46	37.70	0.53
4	Flanagan/CLF CONS		26.83	3,161.19	118.70	2.07	3,723.25	137.00	2.43	4,270.45	155.60	2.79
5	Fullerton		36.00	59,418.20	Infinity	0.82	74,092.27	Infinity	1.03	87,866.16	Infinity	1.22
6	Goldsmth 5600/CA	(***)	12.92	-12,776.62	0.70	-0.29	-10,094.58	3.80	-0.23	-7,711.91	6.40	-0.18
7	Goldsmth/Landreth(2)		23.33	1,890.79	17.20	0.10	4,043.78	19.50	0.21	5,958.71	21.40	0.31
8	Lee Harrison/West		19.92	28.83	15.60	0.02	193.38	19.20	0.12	356.15	22.80	0.23
9	North Riley "CF"		18.67	9,325.37	28.20	0.28	13,960.36	35.00	0.41	18,352.54	41.80	0.54
10	Ownby CLF	(**)	20.58	-1,867.67	5.40	-0.17	-952.90	10.00	-0.09	-57.31	14.70	-0.01
11	Prentice 6700		27.58	20,035.17	96.50	1.24	24,291.26	infinity	1.50	28,480.92	infinity	1.76
12	Prentice NE		26.67	8,991.26	27.70	0.23	14,158.07	35.30	0.35	19,221.28	43.10	0.48
13	Prentice SW		16.58	3,077.56	24.60	0.16	5,416.07	32.50	0.28	7,702.31	40.80	0.40
14	Robertson/North		23.00	32,025.37	48.90	0.93	39,559.62	58.00	1.15	46,772.27	67.50	1.36
15	Russel/7000 CFU	(**)	22.25	-4,600.85	3.00	-0.15	-2,247.57	8.20	-0.07	24.98	15.10	0.00
16	Smyer/East	(**)	17.75	-2,018.03	8.50	-0.17	-1,052.35	11.60	-0.09	-92.10	14.70	-0.01
17	Smyer Ellwood"A"		19.50	4,769.11	398.40	0.72	6,043.14	482.70	0.91	7,306.63	575.10	1.10
18	Wasson 72/Gaines	(***)	15.42	-1,927.23	4.30	-0.20	-1,086.04	8.70	-0.11	-266.10	13.40	-0.03
19	Wasson 72/Gibson		18.33	9,904.30	56.20	1.20	11,996.92	65.90	1.45	14,009.99	75.80	1.70
20	Wasson 72/South		13.75	17,380.22	540.40	7.94	19,853.24	634.70	9.07	22,253.42	728.50	10.16
21	Wasson 72/Yoakum		10.00	154.29	16.00	0.03	753.62	19.90	0.14	1,334.45	23.60	0.25
22	Wasson NE CF/North	(***)	14.50	-1,680.47	7.80	-0.19	-931.87	11.00	-0.11	-196.35	14.20	-0.02
	TOTAL			170,161.66			218,084.97			264,074.16		
	FED TAX=TOTAL*44.83%			143,548.37			183,976.48			222,772.96		

(CO2) EXCLUDED FROM ANALYSIS *(***) EXCLUDED, NOT PROFITABLE @ 15% DISCOUNT RATE*

Table 4.5–SUMMARY OF THE ECONOMIC EVALUATION FOR IORC SAN ANDRES UNITS (8)

(The Case: Average Injected Water to Oil Produced Ratio = 8)

($18.00/BBL)

	UNITS	CO2 EXCL	LIFE (year)	NPV BEFORE TAX (MS)	NPV AFTER TAX (MS)	NPV Diff. (MS)	NPV Diff. (%)	DPI ($)	DCFROR ($)
1	ADAIR "SA"		42.5	104,245	57,256.45	46,988.55	45.08	4.74	Infinity
2	FUHRMAN MASCHO/BL10 "GBS	(*)	10.4	-160	-192	0.00	0.00	-0.06	13
3	FUHRMAN MASCHO/BL9 "GBSA"		15.4	9,265	5,010.20	4,254.80	45.92	0.98	73.9
4	JOHNSON /"GB" "SA"		14.6	5,900	3,773.93	2,126.07	36.04	0.58	29.6
5	JOHNSON/"AB" "SA"	(**)	12.8	-967	-1,167.00	0.00	0.00	-0.12	5.8
6	LEVELLAND/N CEN UN "SA"	CO2	28.5	42,997	25,721.43	17,275.57	40.18	1.12	78.8
7	MABEE/JE MABEE 'A' "SA"		17.3	13,815	7,622.55	6,192.45	44.82	0.29	34.5
8	MEANS "SA"	CO2	24.3	42,157	19,363.52	22,793.48	54.07	0.24	23.6
9	OWNBY "SA"		32.4	16,511	9,297.91	7,213.09	43.69	2.02	266.1
10	OWNBY/BL GILSTRAP"SA"		22.8	435	238.62	196.38	45.14	0.23	22.7
11	SABLE "SA"		20.8	469	363.79	105.21	22.43	0.07	17
12	SEMINLE/"SA"	CO2	23.8	499,658	321,373.10	178,284.90	35.68	10.74	infinity
13	SHAFTER "SA"		10.5	10,294	5,999.88	4,294.12	41.71	0.61	35.6
14	SLAUGHTER/IGOE SMITH "SA"	CO2	36.3	9,934	5,381.03	4,552.97	45.83	1.22	53.8
15	TRIPLE-N "GB"	(*)	11.4	-217	-807	0.00	0.00	-0.07	8.5
16	WASSON/BENNET "SA"		46.4	28,752	15,391.31	13,360.69	46.47	0.52	57.4
17	WASSON/CORNELL "SA"		19.9	26,405	14,670.74	11,734.26	44.44	1.73	301.6
18	WASSON/DENVER "SA"	CO2	39.9	591,198	319,959.70	271,238.30	45.88	1.68	28.7
19	WASSON/REBORTS "SA"		17.3	46,150	25,271.26	20,878.74	45.24	2.36	Infinity
20	WASSON/WILLARD "SA"		29.1	335,841	183,553.80	152,287.20	45.35	5.99	Infinity
21	WEST SEMINOLE "SA"		32.1	95,529	53,914.48	41,614.52	43.56	4.12	Infinity
	TOTAL			692,644	381,197	311,447	44.96		
	TOTAL FEDERAL INCOME TAX					311,447			

(CO2) EXCLUDED FROM ANALYSIS *(***) EXCLUDED , NOT PROFITABLE @15% DISCOUNT RATE*

Table 4.5--Continued

(The Case: Average Injected Water to Oil Produced Ratio = 8)

($20.00/BBL)

	UNITS	CO2 EXCL	LIFE (year)	PV BEFORE TAX (MS)	NPV AFTER TAX (MS)	NPV Diff. (MS)	NPV Diff. %	DPI ($)	DCFROR ($)
1	ADAIR "SA"		42.5	118,914	65,421.77	53,492.23	44.98	5.42	Infinity
2	FUHRMAN MASCHO/BL10 "GBSA"		10.4	346	107.66	238.34	68.88	0.03	16.1
3	FUHRMAN MASCHO/BL9 "GBSA"		15.4	11,250	6,142.59	5,107.41	45.40	1.2	91.6
4	JOHNSON /"GB" "SA"		14.6	7,697	4,906.30	2,790.70	36.26	0.75	33.5
5	JOHNSON/"AB" "SA"	(**)	12.8	500	-344	0.00	0.00	-0.03	12.2
6	LEVELLAND/N CEN UN "SA"	CO2	28.5	52,156	31,307.40	20,848.60	39.97	1.37	109.4
7	MABEE/JE MABEE 'A' "SA"		17.3	19,828	11,451.35	8,376.65	42.25	0.43	43.4
8	MEANS "SA"	CO2	24.3	60,916	29,917.61	30,998.39	50.8[illegible]	0.37	28.3
9	OWNBY "SA"		32.4	19,296	10,907.98	8,388.02	43.47	2.37	336.4
10	OWNBY/BL GILSTRAP"SA"		22.8	655	370.91	284.09	43.37	0.36	26.9
11	SABLE "SA"		20.8	1,347	924.13	422.87	31.39	0.18	19.9
12	SEMINLE/"SA"	CO2	23.8	566,087	364,033.20	202,053.80	35.69	12.17	infinity
13	SHAFTER "SA"		10.5	13,066	7,665.30	5,400.70	41.33	0.78	41
14	SLAUGHTER/IGOE SMITH "SA"	CO2	36.3	11,886	6,480.70	5,405.30	45.48	1.47	62.5
15	TRIPLE-N "GB"		11.4	1,548	187.92	1,360.08	87.86	0.02	16.6
16	WASSON/BENNET "SA"		46.4	37,078	20,262.10	16,815.90	45.35	0.68	82.9
17	WASSON/CORNELL "SA"		19.9	30,896	17,236.79	13,659.21	44.21	2.04	497
18	WASSON/DENVER "SA"	CO2	39.9	694,111	377,509.20	316,601.80	45.61	1.98	30.2
19	WASSON/REBORTS "SA"		17.3	53,557	29,434.36	24,122.64	45.04	2.75	Infinity
20	WASSON/WILLARD "SA"		29.1	382,341	209,240.00	173,101.00	45.27	6.83	Infinity
21	WEST SEMINOLE "SA"		32.1	108,754	61,470.48	47,283.52	43.48	4.7	Infinity
	TOTAL			807,073	445,386	361,687	44.81		
	TOTAL FEDERAL INCOME TAX					361,687			

Table 4.5--Continued

(The Case: Average Injected Water to Oil Produced Ratio = 8)

($22.00/BBL)

	UNITS	CO2 EXCL	LIFE (year)	PV BEFORE TA (MS)	PV AFTER TAX (MS)	NPV Diff. (MS)	NPV Diff. %	DPI ($)	DCFROR ($)
1	ADAIR "SA"		42.5	133,582	73,587.36	59,994.64	44.91	6.09	Infinity
2	FUHRMAN MASCHO/BL10 "GBSA"		10.4	852	407.84	444.16	52.13	0.12	19
3	FUHRMAN MASCHO/BL9 "GBSA"		15.4	13,234	7,274.98	5,959.02	45.03	1.42	111.3
4	JOHNSON /"GB" "SA"		14.6	9,495	6,038.67	3,456.33	36.40	0.93	37.2
5	JOHNSON/"AB" "SA"		12.8	1,969	480	0.00	0.00	0.05	19
6	LEVELLAND/N CEN UN "SA"	CO2	28.5	61,315	36,896.00	24,419.00	39.83	1.61	156
7	MABEE/JE MABEE 'A' "SA"		17.3	25,841	15,280.16	10,560.84	40.87	0.57	51.7
8	MEANS "SA"	CO2	24.3	79,676	40,471.68	39,204.32	49.20	0.5	33.1
9	OWNBY "SA"		32.4	22,081	12,518.04	9,562.96	43.31	2.72	420.5
10	OWNBY/BL GILSTRAP"SA"		22.8	875	503.19	371.81	42.49	0.49	31
11	SABLE "SA"		20.8	2,224	1,484.47	739.53	33.25	0.29	22.8
12	SEMINLE/"SA"	CO2	23.8	624,970	401,846.10	223,123.90	35.70	13.43	infinity
13	SHAFTER "SA"		10.5	15,838	9,330.71	6,507.29	41.09	0.95	46.3
14	SLAUGHTER/IGOE SMITH "SA"	CO2	36.3	13,838	7,580.38	6,257.62	45.22	1.71	71.5
15	TRIPLE-N "GB"		11.4	3,313	1,183.04	2,129.96	64.29	0.11	25.3
16	WASSON/BENNET "SA"		46.4	45,403	25,132.89	20,270.11	44.64	0.85	120.5
17	WASSON/CORNELL "SA"		19.9	35,388	19,802.87	15,585.13	44.04	2.34	870
18	WASSON/DENVER "SA"	CO2	39.9	797,027	435,058.70	361,968.30	45.41	2.29	31.6
19	WASSON/REBORTS "SA"		17.3	60,963	33,597.48	27,365.52	44.89	3.14	Infinity
20	WASSON/WILLARD "SA"		29.1	428,841	234,927.80	193,913.20	45.22	7.66	Infinity
21	WEST SEMINOLE "SA"		32.1	121,978	69,026.44	52,951.56	43.41	5.28	Infinity
	TOTAL			923,846	511,057	412,789	44.68		
	TOTAL FEDERAL INCOME TAX					412,789			

TABLE 4.6–SUMMARY OF THE ECONOMIC EVALUATION FOR IORC SAN ANDRES UNITS (10)

(The Case: Average Injected Water to Oil Produced Ratio = 10)

($18/BBL)

	UNITS	CO2 EXCL	LIFE (year)	NPV BEFORE TAX (M$)	NPV AFTER TAX (M$)	NPV Diff. ($)	NPV Diff. (%)	DPI ($)	DCFROR ($)
1	ADAIR "SA"		42.5	101,346	55,642.24	45,703.76	45.10	4.61	Infinity
2	FUHRMAN MASCHO/BL10 "GBS	(*)	10.4	-277	-262	0.00	0.00	-0.08	12.3
3	FUHRMAN MASCHO/BL9 "GBSA"		15.4	8,796	4,742.36	4,053.64	46.09	0.93	70.1
4	JOHNSON /"GB" "SA"		14.6	5,478	3,507.14	1,970.86	35.98	0.54	28.7
5	JOHNSON/ "AB" "SA"	(**)	12.8	-1,304	-1,357.00	0.00	0.00	-0.14	4.4
6	LEVELLAND/N CEN UN "SA"	CO2	28.5	40,788	24,374.20	16,413.80	40.24	1.06	73.1
7	MABEE/JE MABEE 'A' "SA"		17.3	12,386	6,713.30	5,672.70	45.80	0.25	32.3
8	MEANS "SA"	CO2	24.3	37,783	16,907.53	20,875.47	55.25	0.21	22.5
9	OWNBY "SA"		32.4	15,880	8,934.13	6,945.87	43.74	1.94	252.4
10	OWNBY/BL GILSTRAP"SA"		22.8	385	208.89	176.11	45.74	0.2	21.8
11	SABLE "SA"		20.8	301	256.79	44.21	14.69	0.05	16.4
12	SEMINLE/"SA"	CO2	23.8	484,903	311,897.80	173,005.20	35.68	10.43	infinity
13	SHAFTER "SA"		10.5	9,757	5,678.32	4,078.68	41.80	0.58	34.6
14	SLAUGHTER/IGOE SMITH "SA"	CO2	36.3	9,502	5,138.18	4,363.82	45.93	1.16	51.9
15	TRIPLE-N "GB"	(**)	11.4	-637	-1,043.00	0.00	0.00	-0.09	6.6
16	WASSON/BENNET "SA"		46.4	27,033	14,388.12	12,644.88	46.78	0.49	53.1
17	WASSON/CORNELL "SA"		19.9	25,673	14,257.17	11,415.83	44.47	1.68	279.3
18	WASSON/DENVER "SA"	CO2	39.9	571,218	308,787.30	262,430.70	45.94	1.62	28.4
19	WASSON/REBORTS "SA"		17.3	44,500	24,346.32	20,153.68	45.29	2.27	Infinity
20	WASSON/WILLARD "SA"		29.1	325,387	177,728.20	147,658.80	45.38	5.8	Infinity
21	WEST SEMINOLE "SA"		32.1	93,865	52,970.54	40,894.46	43.57	4.05	Infinity
	TOTAL			670,787	369,374	301,413.48	44.93		
	TOTAL FEDERAL INCOME TAX					301,413.48			

(CO2) EXCLUDED FROM ANALYSIS

(***) EXCLUDED , NOT PROFITABLE @15% DISCOUNT RATE

TABLE 4.6--Continued

(The Case: Average Injected Water to Oil Produced Ratio = 10)

($20/BBL)

	UNITS	CO2 EXCL	LIFE (year)	NPV BEFORE TAX (MS)	NPV AFTER TAX (MS)	NPV Diff. (MS)	NPV Diff. (%)	DPI ($)	DCFROR ($)
1	ADAIR "SA"		42.5	116,014	63,807.83	52,206.17	45.00	5.28	Infinity
2	FUHRMAN MASCHO/BL10 "GBS		10.4	228	37.92	190.08	83.37	0.01	15.4
3	FUHRMAN MASCHO/BL9 "GBSA"		15.4	10,780	5,874.76	4,905.24	45.50	1.15	87.3
4	JOHNSON /"GB" "SA"		14.6	7,275	4,639.50	2,635.50	36.23	0.71	32.6
5	JOHNSON/ "AB" "SA"	(**)	12.8	163	-532	0.00	0.00	-0.05	10.7
6	LEVELLAND/N CEN UN "SA"	CO2	28.5	49,948	29,960.22	19,987.78	40.02	1.31	101.1
7	MABEE/JE MABEE 'A' "SA"		17.3	18,401	10,542.11	7,858.89	42 71	0.4	41.3
8	MEANS "SA"	CO2	24.3	56,542	27,461.61	29,080.39	51.43	0.34	27.2
9	OWNBY "SA"		32.4	18,666	10,544.20	8,121.80	43.51	2.29	320.3
10	OWNBY/BL GILSTRAP"SA"		22.8	606	341.18	264.82	43.70	0.33	25.9
11	SABLE "SA"		20.8	1,179	817.13	361.87	30.69	0.16	19.4
12	SEMINLE/"SA"	CO2	23.8	551,333	354,558.00	196,775.00	35.69	11.85	Infinity
13	SHAFTER "SA"		10.5	12,530	7,343.74	5,186.26	41.39	0.75	39.9
14	SLAUGHTER/IGOE SMITH "SA"	CO2	36.3	11,455	6,237.84	5,217.16	45.54	1.41	60.6
15	TRIPLE-N "GB"	(**)	11.4	112	-48	0.00	0.00	0	14.6
16	WASSON/BENNET "SA"		46.4	35,358	19,258.89	16,099.11	45.53	0.65	77
17	WASSON/CORNELL "SA"		19.9	30,165	16,823.23	13,341.77	44.23	1.99	456.9
18	WASSON/DENVER "SA"	CO2	39.9	674,132	366,336.90	307,795.10	45.66	1.93	29.9
19	WASSON/REBORTS "SA"		17.3	51,906	28,509.44	23,396.56	45.07	2.66	Infinity
20	WASSON/WILLARD "SA"		29.1	371,787	203,415.10	168,371.90	45.29	6.63	Infinity
21	WEST SEMINOLE "SA"		32.1	107,854	60,526.46	47,327.54	43.88	4.63	Infinity
	TOTAL			782,749	432.481	350,267.51	44.75		
	TOTAL FEDERAL INCOME TAX					350,267.51			

TABLE 4.6--Continued

(The Case: Average Injected Water to Oil Produced Ratio = 10)

($22/BBL)

	UNITS	CO2 EXCL	LIFE (year)	NPV BEFORE TAX (M$)	NPV AFTER TAX (M$)	NPV Diff. ($)	NPV Diff. (%)	DPI ($)	DCFROR ($)
1	ADAIR "SA"		42.5	130,683	71,973.42	58,709.58	44.93	5.96	Infinity
2	FUHRMAN MASCHO/BL10 "GBS		10.4	735	338.1	396.90	54.00	0.1	18.3
3	FUHRMAN MASCHO/BL9 "GBSA"		15.4	12,765	7,007.15	5,757.85	45.11	1.37	106.5
4	JOHNSON /"GB" "SA"		14.6	9,073	5,771.87	3,301.13	36.38	0.89	36.3
5	JOHNSON/ "AB" "SA"		12.8	1,631	291.57	1,339.43	82.12	0.03	17.4
6	LEVELLAND/N CEN UN "SA"	CO2	28.5	59,107	35,546.19	23,560.81	39.86	1.55	143.3
7	MABEE/JE MABEE 'A' "SA"		17.3	24,413	14,370.92	10,042.08	41.13	0.54	49.8
8	MEANS "SA"	CO2	24.3	75,301	38,015.66	37,285.34	49.52	0.47	31.9
9	OWNBY "SA"		32.4	21,451	12,154.26	9,296.74	43.34	2.64	401.4
10	OWNBY/BL GILSTRAP"SA"		22.8	825	473.47	351.53	42.61	0.46	30.1
11	SABLE "SA"		20.8	2,056	1,377.48	678.52	33.00	0.27	22.3
12	SEMINLE/"SA"	CO2	23.8	610,215	392,370.90	217,844.10	35.70	13.12	Infinity
13	SHAFTER "SA"		10.5	15,302	9,009.16	6,292.84	41.12	0.92	45.3
14	SLAUGHTER/IGOE SMITH "SA"	CO2	36.3	13,407	7,337.53	6,069.47	45.27	1.66	69.5
15	TRIPLE-N "GB"		11.4	2,894	946.56	1,947.44	67.29	0.08	23.2
16	WASSON/BENNET "SA"		46.4	43,684	24,129.68	19,554.32	44.76	0.82	111.5
17	WASSON/CORNELL "SA"		19.9	34,657	19,389.29	15,267.71	44.05	2.29	793.3
18	WASSON/DENVER "SA"	CO2	39.9	777,048	423,886.30	353,161.70	45.45	2.23	31.3
19	WASSON/REBORTS "SA"		17.3	59,313	32,672.55	26,640.45	44.92	3.05	Infinity
20	WASSON/WILLARD "SA"		29.1	418,287	229,102.20	189,184.80	45.23	7.47	Infinity
21	WEST SEMINOLE "SA"		32.1	123,003	68,082.42	54,920.58	44.65	5.21	Infinity
	TOTAL			900,772	497,090	403,681.90	44.82		
	TOTAL FEDERAL INCOME TAX					403,681.90			

TABLE 4.7–INCREMENTAL OIL PRODUCTION PER YEAR FOR IORC CLEARFORK UNITS
(BBL/year)

EXCLUDED		UNITS	TOT RCVY	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7
(***)	1	DIAMOND M/JACK	225111	2516	11898	20456	19851	33460	28900	23810
(*)	2	DIAMOND M/McLA AC 1	204409	9269	3381	8327	14966	35317	32829	30119
CO2	3	DOLLARHIDE/'AB'	9789201	74834	196667	229388	253842	448461	466510	427401
	4	FLANAGAN/CLEARFORK	1933523	10798	70831	107708	145630	135870	122995	98103
	5	FULLERTON	98612449	288028	823119	972628	1460776	2184551	2778674	2737658
(***)	6	GLDSMTH 5600/CA GLD	5779281	111765	402882	692260	576812	375813	386048	398266
	7	GOLDSMTH/LANDRETH	8922063	30966	220630	342114	377175	452001	541645	610656
	8	LEE HARRISON/WEST	613447	1352	20700	30974	35253	27088	26721	34163
	9	NORTH RILEY"CF"	10867835	190554	607646	994347	1086996	975370	968484	859817
(**)	10	OWNBY/UCFU	2114689	121019	126850	161825	216529	176120	158025	143012
	11	PRENTICE 6700/6700 CLFK	12538305	89609	253969	241996	244456	307337	499100	778085
	12	PRENTICE/NE	17457298	34903	260707	421196	635004	1259852	1607841	1740717
	13	PRENTICE/SW	5487316	42940	458726	502463	585693	558652	509657	446166
	14	ROBERTSON/NORTH	22633324	391764	1043607	1464270	1561932	1480021	1585418	1713901
(**)	15	RUSSEL/7000 CFU	6408549	157310	344509	358011	389347	336822	396695	637148
(**)	16	SMYER/EAST	2527471	17587	36530	174493	168059	155629	140990	132175
	17	SMYER/ELLWOOD "A"	4319576	12525	176242	234655	230393	225114	267578	350218
(***)	18	WASSON 72/GAINES	1738230	117225	200109	180377	152441	132023	114150	98687
	19	WASSON 72/GIBSON	5720996	36833	210240	291845	345412	335762	485114	509887
	20	WASSON 72/SOUTH	4668192	98503	465359	638595	563700	486255	416780	356366
	21	WASSON 72/YOAKUM	1189670	17731	105175	89470	81186	75133	147921	189855
(**)	22	WASSON NE CF/NORTH	1621929	14947	104568	185488	172863	152984	135391	119821
18.00/BBL		*TOTAL OIL RCVY*	194,963,993	1,246,507	4,716,951	6,332,261	7,353,605	8,503,007	9,957,927	10,425,594
		% OF TOTAL RCVY	*100.00*	*0.64*	*2.42*	*3.25*	*3.77*	*4.36*	*5.11*	*5.35*
@$20.00/BBL		*TOTAL OIL RCVY*	195,168,402	1,255,777	4,720,332	6,340,588	7,368,571	8,538,324	9,990,756	10,455,713
		% OF TOTAL RCVY	*100.00*	*0.64*	*2.42*	*3.25*	*3.78*	*4.37*	*5.12*	*5.36*
@$22.00/BBL		*TOTAL OIL RCVY*	207,841,040	1,566,639	5,332,789	7,220,406	8,315,369	9,359,878	10,821,856	11,487,869
		% OF TOTAL RCVY	*100.00*	*0.75*	*2.57*	*3.47*	*4.00*	*4.50*	*5.21*	*5.53*

(CO2) EXCLUDED FROM ANALYSIS *(***) EXCLUDED, NOT PROFITABLE @ 15% DISCOUNT RATE*

TABLE 4.7–Continued

(BBL/year)

UNITS	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16
DIAMOND M/JACK	21490	18172	14576	12354	11474	6154	0	0	0
DIAMOND M/McLA AC	27958	26012	16230	0	0	0	0	0	0
DOLLARHIDE/'AB'	499797	700387	816620	800796	721859	643980	569356	503379	445047
FLANAGAN/CLEARFOR	91868	91816	99621	78816	73068	67682	62693	58071	53790
FULLERTON	2905872	3188452	3449728	3805654	3784742	3398906	3600970	4585251	4732879
GLDSMTH 5600/CA GLD	384752	368471	352050	335646	736869	657647	0	0	0
GOLDSMTH/LANDRET	664837	626940	562770	504977	452939	406095	363938	326010	476555
LEE HARRISON/WEST	38443	32523	32201	30098	28961	29535	34011	43434	39959
NORTH RILEY"CF"	743234	647092	563148	489875	425936	370159	383344	417415	367325
OWNBY/UCFU	129426	117131	106003	95933	86819	78571	71107	64352	58239
PRENTICE 6700/6700 CL	849522	936186	855735	770161	693145	623830	561447	505303	454772
PRENTICE/NE	1596714	1300056	1149490	1015844	873200	753796	650313	560665	483037
PRENTICE/SW	384508	331446	285706	246279	263947	243501	209898	180932	155963
ROBERTSON/NORTH	1628777	1399248	1202769	1104292	1216532	1191841	1038651	891183	763363
RUSSEL/7000 CFU	628578	457324	427349	375002	335159	295650	260719	229845	202561
SMYER/EAST	178594	139237	136020	130621	125310	120101	115005	110034	105195
SMYER/ELLWOOD "A"	324310	281889	250800	236124	218316	191591	169558	151393	271619
WASSON 72/GAINES	85310	73738	63728	55072	47585	123736	133564	116470	44014
WASSON 72/GIBSON	614077	510907	428558	356214	295617	244902	243191	242304	205222
WASSON 72/SOUTH	304041	258880	220025	186688	188899	296627	187473	0	0
WASSON 72/YOAKUM	174667	160694	147838	0	0	0	0	0	0
WASSON NE CF/NORTH	106041	93847	83054	73503	65050	107489	142090	64794	0
TOTAL OIL RCVY	10,320,870	9,766,129	9,248,389	8,825,021	8,515,302	7,818,465	7,505,486	7,961,960	8,004,487
% OF TOTAL RCVY	*5.29*	*5.01*	*4.74*	*4.53*	*4.37*	*4.01*	*3.85*	*4.08*	*4.11*
TOTAL OIL RCVY	10,348,828	9,792,141	9,264,620	8,825,021	8,515,302	7,818,465	7,505,486	7,961,960	8,004,487
% OF TOTAL RCVY	*5.30*	*5.02*	*4.75*	*4.52*	*4.36*	*4.01*	*3.85*	*4.08*	*4.10*
TOTAL OIL RCVY	11,391,468	10,599,679	10,017,045	9,500,080	9,127,640	8,420,276	8,094,408	8,430,986	8,370,481
% OF TOTAL RCVY	*5.48*	*5.10*	*4.82*	*4.57*	*4.39*	*4.05*	*3.89*	*4.06*	*4.03*

TABLE 4.7--Continued

(BBL/year)

UNITS	YEAR 17	YEAR 18	YEAR 19	YEAR 20	YEAR 21	YEAR 22	YEAR 23	YEAR 24	YEAR 25
DIAMOND M/JACK	0	0	0	0	0	0	0	0	0
DIAMOND M/McLA AC 1	0	0	0	0	0	0	0	0	0
DOLLARHIDE/'AB'	393475	347879	307567	271926	240415	212556	187925	29132	
FLANAGAN/CLEARFORK	49825	46152	42749	39597	36678	33973	31468	29148	26999
FULLERTON	3814404	4249427	4280554	3972070	3654305	3361960	3093004	2845563	2973493
GLDSMTH 5600/CA GLDS	0	0	0	0	0	0	0	0	0
GOLDSMTH/LANDRETH	448560	407311	369854	335842	304958	95288	0	0	0
LEE HARRISON/WEST	36763	33822	31116	26331	0	0	0	0	0
NORTH RILEY"CF"	323246	284457	169391	0	0	0	0	0	0
OWNBY/UCFU	52706	47699	43167	39067	21088	0	0	0	0
PRENTICE 6700/6700 CLF	409295	368366	401065	366953	330258	297232	267509	240758	216682
PRENTICE/NE	415848	357722	307462	264027	226512	194128	262189	291872	255863
PRENTICE/SW	80839	0	0	0	0	0	0	0	0
ROBERTSON/NORTH	652658	556851	474010	402449	340694	287462	241632	0	0
RUSSEL/7000 CFU	178456	157164	138363	102538	0	0	0	0	0
SMYER/EAST	100493	146558	172548	122291	0	0	0	0	0
SMYER/ELLWOOD "A"	240383	212739	188274	85855	0	0	0	0	0
WASSON 72/GAINES	0	0	0	0	0	0	0	0	0
WASSON 72/GIBSON	173815	147214	43883	0	0	0	0	0	0
WASSON 72/SOUTH	0	0	0	0	0	0	0	0	0
WASSON 72/YOAKUM	0	0	0	0	0	0	0	0	0
WASSON NE CF/NORTH	0	0	0	0	0	0	0	0	0
TOTAL OIL RCVY	6,645,635	6,664,059	6,308,358	5,493,125	4,893,404	4,270,044	3,895,802	3,407,341	3,473,037
% OF TOTAL RCVY	*3.41*	*3.42*	*3.24*	*2.82*	*2.51*	*2.19*	*2.00*	*1.75*	*1.78*
TOTAL OIL RCVY	6,645,635	6,664,059	6,308,358	5,493,125	4,893,404	4,270,044	3,895,802	3,407,341	3,473,037
% OF TOTAL RCVY	*3.41*	*3.41*	*3.23*	*2.81*	*2.51*	*2.19*	*2.00*	*1.75*	*1.78*
TOTAL OIL RCVY	6,977,290	7,015,480	6,662,437	5,757,020	4,914,493	4,270,044	3,895,802	3,407,341	3,473,037
% OF TOTAL RCVY	*3.36*	*3.38*	*3.21*	*2.77*	*2.36*	*2.05*	*1.87*	*1.64*	*1.67*

TABLE 4.7–Continued

(BBL/year)

UNITS	YEAR 26	YEAR 27	YEAR 28	YEAR 29	YEAR 30	YEAR 31	YEAR 32	YEAR 33	YEAR34	YEAR 35	YEAR 36
DIAMOND M/JACK	0	0	0	0	0	0	0	0	0	0	0
DIAMOND M/McLA A	0	0	0	0	0	0	0	0	0	0	0
DOLLARHIDE/'AB'	0	0	0	0	0	0	0	0	0	0	0
FLANAGAN/CLEARF	124062	103511	0	0	0	0	0	0	0	0	0
FULLERTON	2882614	2689117	2439844	2244657	2065084	1899878	1747887	1608056	1479412	1361059	1252174
GLDSMTH 5600/CA	0	0	0	0	0	0	0	0	0	0	0
GOLDSMTH/LANDR	0	0	0	0	0	0	0	0	0	0	0
LEE HARRISON/WES	0	0	0	0	0	0	0	0	0	0	0
NORTH RILEY"CF"	0	0	0	0	0	0	0	0	0	0	0
OWNBY/UCFU	0	0	0	0	0	0	0	0	0	0	0
PRENTICE 6700/6700	195014	175512	157961	142165	127949	115154	61779	0	0	0	0
PRENTICE/NE	224298	196626	117415	0	0	0	0	0	0	0	0
PRENTICE/SW	0	0	0	0	0	0	0	0	0	0	0
ROBERTSON/NORTH	0	0	0	0	0	0	0	0	0	0	0
RUSSEL/7000 CFU	0	0	0	0	0	0	0	0	0	0	0
SMYER/EAST	0	0	0	0	0	0	0	0	0	0	0
SMYER/ELLWOOD "	0	0	0	0	0	0	0	0	0	0	0
WASSON 72/GAINES	0	0	0	0	0	0	0	0	0	0	0
WASSON 72/GIBSON	0	0	0	0	0	0	0	0	0	0	0
WASSON 72/SOUTH	0	0	0	0	0	0	0	0	0	0	0
WASSON 72/YOAKU	0	0	0	0	0	0	0	0	0	0	0
WASSON NE CF/NOR	0	0	0	0	0	0	0	0	0	0	0
TOTAL OIL RCVY	3,425,988	3,164,766	2,715,220	2,386,822	2,193,033	2,015,031	1,809,666	1,608,056	1,479,412	1,361,059	1,252,174
% OF TOTAL RCVY	*1.76*	*1.62*	*1.39*	*1.22*	*1.12*	*1.03*	*0.93*	*0.82*	*0.76*	*0.70*	*0.64*
TOTAL OIL RCVY	3,425,988	3,164,766	2,715,220	2,386,822	2,193,033	2,015,031	1,809,666	1,608,056	1,479,412	1,361,059	1,252,174
% OF TOTAL RCVY	*1.76*	*1.62*	*1.39*	*1.22*	*1.12*	*1.03*	*0.93*	*0.82*	*0.76*	*0.70*	*0.64*
TOTAL OIL RCVY	3,425,988	3,164,766	2,715,220	2,386,822	2,193,033	2,015,031	1,809,666	1,608,056	1,479,412	1,361,059	1,252,174
% OF TOTAL RCVY	*1.65*	*1.52*	*1.31*	*1.15*	*1.06*	*0.97*	*0.87*	*0.77*	*0.71*	*0.65*	*0.60*

TABLE 4.8--INCREMENTAL OIL PRODUCTION PER YEAR FOR IORC SAN ANDRES UNITS

EXCLUDED		UNITS	TOT RCVY	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
	1	ADAIR "SA"	21,725,242	402,977	1,265,536	1,594,023	1,822,384	1,667,846	1,432,842
(*)	2	FUHRMAN MASCHO/BL10 "GBS	682,387	4,353	37,268	24,666	38,063	56,876	114,684
	3	FUHRMAN MASCHO/BL9 "GBSA	2,552,404	21,599	268,564	306,018	277,325	265,185	235,143
	4	JOHNSON /"GB" "SA"	3,167,876	18,070	72,580	110,612	105,019	116,073	198,049
(**)	5	JOHNSON/ "AB" "SA"	1,723,449	28,140	112,376	210,163	256,497	238,846	211,237
CO2	6	LEVELLAND/N CEN UN "SA"	23,633,259	125,635	337,027	614,305	1,003,621	1,054,813	1,125,763
	7	MABEE/JE MABEE 'A' "SA"	9,944,191	68,222	384,919	562,630	622,035	612,696	948,671
CO2	8	MEANS "SA"	33,199,964	196,711	1,514,870	2,461,878	2,632,162	2,537,427	2,022,705
	9	OWNBY "SA"	5,639,326	84,647	247,331	247,497	241,607	295,711	310,802
	10	OWNBY/BL GILSTRAP"SA"	288,824	15,938	23,834	23,296	25,003	22,024	20,655
	11	SABLE "SA"	1,525,534	9,468	57,345	46,665	74,971	85,833	81,936
CO2	12	SEMINLE/"SA"	89,124,531	2,148,355	4,740,513	6,947,666	8,815,603	10,269,441	8,940,733
	13	SHAFTER "SA"	2,892,612	64,335	161,771	206,363	172,512	444,787	405,292
CO2	14	SLAUGHTER/IGOE SMITH "SA"	4,235,998	64,655	160,441	194,512	225,393	233,487	213,765
(*)	15	TRIPLE-N "GB"	1,793,115	6,112	359,765	387,472	281,740	174,356	135,680
	16	WASSON/BENNET "SA"	27,119,362	26,108	414,125	502,634	581,864	556,78	653,486
	17	WASSON/CORNELL "SA"	3,575,238	312,988	392,141	343,586	448,209	343,526	310,247
CO2	18	WASSON/DENVER "SA"	558,985,832	142,098	17,757,730	31,577,722	36,060,584	40,837,125	41,406,460
	19	WASSON/ROBERTS "SA"	8,806,863	48,088	549,743	1,043,623	1,390,006	1,318,402	1,019,255
	20	WASSON/WILLARD "SA"	69,746,485	218,698	2,196,135	4,487,844	6,197,919	8,334,209	8,035,636
	21	WEST SEMINOLE "SA"	13,010,284	314,868	840,211	1,179,484	1,044,559	1,175,656	932,238
@$18.00/BBL		*TOTAL OIL RCVY (BBL)*	148,268,998	1,203,029	5,608,698	9,060,251	11,181,030	13,570,888	13,151,411
		% OF TOTAL RCVY	*100.00*	*0.81*	*3.78*	*6.11*	*7.54*	*9.15*	*8.87*
@$20.00/BBL		*TOTAL OIL RCVY (BBL)*	172,469,742	1,616,471	7,271,267	11,066,411	13,323,216	15,469,965	14,834,617
		% OF TOTAL RCVY	*100.00*	*0.94*	*4.22*	*6.42*	*7.72*	*8.97*	*8.60*
@$22.00/BBL		*TOTAL OIL RCVY (BBL)*	174,193,191	1,644,611	7,383,643	11,276,574	13,579,713	15,708,811	15,045,853
		% OF TOTAL RCVY	*100.00*	*0.94*	*4.24*	*6.47*	*7.80*	*9.02*	*8.64*

(CO2) EXCLUDED FROM ANALYSIS *(***) EXCLUDED, NOT PROFITABLE @ 15% DISCOUNT RATE*

TABLE 4.8--Continued

UNITS	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13	YEAR 14
ADAIR "SA"	1,153,150	990,976	850,971	811,912	734,325	643,768	588,891	541,749
FUHRMAN MASCHO/BL10 "GBS	123,426	105,106	88,886	66,888	22,172	0	0	0
FUHRMAN MASCHO/BL9 "GBSA	187,540	161,056	141,398	127,951	124,209	112,330	103,557	95,921
JOHNSON /"GB" "SA"	297,273	452,389	413,543	343,783	290,296	248,391	214,948	187,834
JOHNSON/ "AB" "SA"	155,896	142,201	97,199	77,495	75,012	67,233	51,156	0
LEVELLAND/N CEN UN "SA"	1,161,361	1,186,081	1,159,609	1,279,237	1,180,913	1,064,083	955,804	861 127
MABEE/JE MABEE 'A' "SA"	1,183,072	935,471	744,159	593,105	477,777	388,377	318,150	262,339
MEANS "SA"	1,947,676	1,807,392	1,569,587	1,459,948	1,345,680	1,246,348	1,159,176	1,082,030
OWNBY "SA"	294,052	283,987	249,056	259,715	306,322	290,923	226,767	209,376
OWNBY/BL GILSTRAP"SA"	22,656	21,701	17,828	14,827	12,441	10,569	9,079	7,880
SABLE "SA"	79,672	76,854	73,562	69,961	66,179	62,313	58,432	54,593
SEMINLE/"SA"	7,515,785	6,317,930	5,310,979	4,464,508	3,752,942	3,154,782	2,651,955	2,229,268
SHAFTER "SA"	374,121	339,130	308,667	282,877	132,757	0	0	0
SLAUGHTER/IGOE SMITH "SA"	198,012	174,538	145,653	143,571	118,728	125,662	114,987	103,710
TRIPLE-N "GB"	109,185	90,507	77,610	68,203	70,418	32,067	0	0
WASSON/BENNET "SA"	761,229	734,622	751,717	671,494	781,180	699,963	673,308	701,806
WASSON/CORNELL "SA"	249,032	194,911	186,009	107,921	126,136	106,158	92,028	78,919
WASSON/DENVER "SA"	39,472,633	39,335,012	38,673,899	33,496,448	27,759,664	22,573,727	19,178,771	16,002,242
WASSON/ROBERTS "SA"	902,460	532,319	312,307	263,729	268,373	276,711	178,276	142,547
WASSON/WILLARD "SA"	6,665,758	5,516,422	4,275,257	3,525,546	2,865,274	2,376,480	2,249,525	1,726,732
WEST SEMINOLE "SA"	790,897	665,789	540,976	423,937	425,784	374,347	334,433	300,834
TOTAL OIL RCVY (BBL)	11,807,762	9,914,652	8,014,478	6,684,847	5,876,729	4,946,560	4,458,505	3,768,780
% OF TOTAL RCVY	*7.96*	*6.69*	*5.41*	*4.51*	*3.96*	*3.34*	*3.01*	*2.54*
TOTAL OIL RCVY (BBL)	13,193,523	11,101,240	9,031,945	7,631,850	6,703,644	5,622,395	5,047,396	4,310,528
% OF TOTAL RCVY	*7.65*	*6.44*	*5.24*	*4.43*	*3.89*	*3.26*	*2.93*	*2.50*
TOTAL OIL RCVY (BBL)	13,349,419	11,243,441	9,129,144	7,709,345	6,778,656	5,689,627	5,098,552	4,310,528
% OF TOTAL RCVY	*7.66*	*6.45*	*5.24*	*4.43*	*3.89*	*3.27*	*2.93*	*2.47*

TABLE 4.8--Continued

UNITS	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 201	YEAR 21	YEAR 22	YEAR 23
ADAIR "SA"	489,483	448,767	411,602	379,163	350,315	324,556	301,468	280,700	261,956
FUHRMAN MASCHO/BL10 "GBS	0	0	0	0	0	0	0	0	0
FUHRMAN MASCHO/BL9 "GBSA	89,221	35,388	0	0	0	0	0	0	0
JOHNSON /"GB" "SA"	99,016	0	0	0	0	0	0	0	0
JOHNSON/ "AB" "SA"	0	0	0	0	0	0	0	0	0
LEVELLAND/N CEN UN "SA"	777,930	704,487	837,430	968,114	904,438	846,844	794,581	747,012	703,590
MABEE/JE MABEE 'A' "SA"	395,278	688,550	623,185	135,553	0	0	0	0	0
MEANS "SA"	1,013,254	951,538	895,839	845,313	1,124,471	1,155,737	1,081,173	1,013,600	952,170
OWNBY "SA"	182,577	161,972	144,393	129,295	116,252	104,922	95,029	86,350	78,704
OWNBY/BL GILSTRAP"SA"	6,904	6,101	5,434	4,876	4,404	4,003	3,659	3,362	2,350
SABLE "SA"	84,360	110,963	103,420	96,391	89,839	83,733	59,043	0	0
SEMINLE/"SA"	1,873,948	1,575,260	1,348,084	1,624,060	1,364,211	1,145,937	962,587	808,573	679,201
SHAFTER "SA"	0	0	0	0	0	0	0	0	0
SLAUGHTER/IGOE SMITH "SA"	105,144	110,330	92,475	90,384	85,823	81,586	77,643	73,970	70,544
TRIPLE-N "GB"	0	0	0	0	0	0	0	0	0
WASSON/BENNET "SA"	663,763	666,910	652,940	638,467	623,689	608,764	593,816	578,942	564,220
WASSON/CORNELL "SA"	67,668	58,012	49,728	42,622	36,526	28,871	0	0	0
WASSON/DENVER "SA"	13,349,613	11,821,812	10,331,953	9,111,387	8,093,634	7,236,316	6,507,542	5,882,946	5,343,654
WASSON/ROBERTS "SA"	118959.09	100,283	222,227	119,555	0	0	0	0	0
WASSON/WILLARD "SA"	1399438	1,257,189	1,032,845	912,057	784,760	677,491	586,686	509,491	472,972
WEST SEMINOLE "SA"	275292.46	253,724	235,300	219,397	205,536	193,348	182,545	172,899	258,113
TOTAL OIL RCVY (BBL)	3,382,476	3,339,094	3,069,473	2,298,213	1,861,006	1,701,130	1,520,777	1,351,043	1,376,358
% OF TOTAL RCVY	*2.28*	*2.25*	*2.07*	*1.55*	*1.26*	*1.15*	*1.03*	*0.91*	*0.93*
TOTAL OIL RCVY (BBL)	3,871,959	3,787,861	3,481,075	2,677,376	2,211,321	2,025,687	1,822,245	1,631,743	1,638,314
% OF TOTAL RCVY	*2.25*	*2.20*	*2.02*	*1.55*	*1.28*	*1.17*	*1.06*	*0.95*	*0.95*
TOTAL OIL RCVY (BBL)	3,871,959	3,787,861	3,481,075	2,677,376	2,211,321	2,025,687	1,822,245	1,631,743	1,638,314
% OF TOTAL RCVY	*2.22*	*2.17*	*2.00*	*1.54*	*1.27*	*1.16*	*1.05*	*0.94*	*0.94*

TABLE 4.8--Continued

UNITS	YEAR 24	YEAR 25	YEAR 26	YEAR 27	YEAR 28	YEAR 39	YEAR 30	YEAR 31
ADAIR "SA"	244986.34	229,577	215,545	202,733	191,008	180,249	170,357	161,241
FUHRMAN MASCHO/BL10 "GBS	0	0	0	0	0	0	0	0
FUHRMAN MASCHO/BL9 "GBSA	0	0	0	0	0	0	0	0
JOHNSON /"GB" "SA"	0	0	0	0	0	0	0	0
JOHNSON/ "AB" "SA"	0	0	0	0	0	0	0	0
LEVELLAND/N CEN UN "SA"	663847.62	627,380	593,837	562,914	534,345	257,130	0	0
MABEE/JE MABEE 'A' "SA"	0	0	0	0	0	0	0	0
MEANS "SA"	896159.61	287,119	0	0	0	0	0	0
OWNBY "SA"	135302.52	126,458	118,453	111,185	104,566	98,521	92,986	87,904
OWNBY/BL GILSTRAP"SA"	0	0	0	0	0	0	0	0
SABLE "SA"	0	0	0	0	0	0	0	0
SEMINLE/"SA"	482212.71	0	0	0	0	0	0	0
SHAFTER "SA"	0	0	0	0	0	0	0	0
SLAUGHTER/IGOE SMITH "SA"	67344.43	64,352	61,550	58,923	56,457	54,140	89,697	137,207
TRIPLE-N "GB"	0	0	0	0	0	0	0	0
WASSON/BENNET "SA"	549707.86	535,452	521,486	507,836	494,519	481,547	468,928	456,664
WASSON/CORNELL "SA"	0	0	0	0	0	0	0	0
WASSON/DENVER "SA"	4,874,872	4,464,869	4,104,248	3,785,415	3,738,476	3,792,827	3,535,195	3,302,952
WASSON/ROBERTS "SA"	0	0	0	0	0	0	0	0
WASSON/WILLARD "SA"	724919.6	651,183	586,588	529,808	479,735	435,441	34,449	0
WEST SEMINOLE "SA"	251185.08	236,837	223,774	211,843	200,913	190,871	181,619	173,075
TOTAL OIL RCVY (BBL)	1,661,115	1,549,929	1,450,302	1,360,673	1,279,734	1,206,380	777,982	717,643
% OF TOTAL RCVY	*1.12*	*1.05*	*0.98*	*0.92*	*0.86*	*0.81*	*0.52*	*0.48*
TOTAL OIL RCVY (BBL)	1,906,101	1,779,506	1,665,846	1,563,406	1,470,741	1,386,630	948,339	878,884
% OF TOTAL RCVY	*1.11*	*1.03*	*0.97*	*0.91*	*0.85*	*0.80*	*0.55*	*0.51*
TOTAL OIL RCVY (BBL)	1,906,101	1,779,506	1,665,846	1,563,406	1,470,741	1,386,630	948,339	878,884
% OF TOTAL RCVY	*1.09*	*1.02*	*0.96*	*0.90*	*0.84*	*0.80*	*0.54*	*0.50*

TABLE 4.8–Continued

UNITS	YEAR 32	YEAR33	YEAR 34	YEAR 35	YEAR 36	YEAR 37	YEAR 38	YEAR 39
ADAIR "SA"	152,824	161,242	137,819	201,860	262,273	251,262	240,931	231,224
FUHRMAN MASCHO/BL10 "GBS	0	0	0	0	0	0	0	0
FUHRMAN MASCHO/BL9 "GBSA	0	0	0	0	0	0	0	0
JOHNSON /"GB" "SA"	0	0	0	0	0	0	0	0
JOHNSON/ "AB" "SA"	0	0	0	0	0	0	0	0
LEVELLAND/N CEN UN "SA"	0	0	0	0	0	0	0	0
MABEE/JE MABEE 'A' "SA"	0	0	0	0	0	0	0	0
MEANS "SA"	0	0	0	0	0	0	0	0
OWNBY "SA"	83,278	33,386	0	0	0	0	0	0
OWNBY/BL GILSTRAP"SA"	0	0	0	0	0	0	0	0
SABLE "SA"	0	0	0	0	0	0	0	0
SEMINLE/"SA"	0	0	0	0	0	0	0	0
SHAFTER "SA"	0	0	0	0	0	0	0	0
SLAUGHTER/IGOE SMITH "SA"	131,357	125,872	120,724	115,886	111,332	36,145	0	0
TRIPLE-N "GB"	0	0	0	0	0	0	0	0
WASSON/BENNET "SA"	444,757	433,203	422,000	411,141	400,620	605,776	693,095	671,582
WASSON/CORNELL "SA"	0	0	0	0	0	0	0	0
WASSON/DENVER "SA"	3,092,866	2,902,207	2,728,650	2,570,209	2,425,180	2,292,088	2,169,661	2,056,786
WASSON/ROBERTS "SA"	0	0	0	0	0	0	0	0
WASSON/WILLARD "SA"	0	0	0	0	0	0	0	0
WEST SEMINOLE "SA"	0	0	0	0	0	0	0	0
TOTAL OIL RCVY (BBL)	528,034	466,589	422,000	411,141	400,620	605,776	693,095	671,582
% OF TOTAL RCVY	*0.36*	*0.31*	*0.28*	*0.28*	*0.27*	*0.41*	*0.47*	*0.45*
TOTAL OIL RCVY (BBL)	680,859	627,831	559,819	613,001	662,893	857,038	934,026	902,806
% OF TOTAL RCVY	*0.39*	*0.36*	*0.32*	*0.36*	*0.38*	*0.50*	*0.54*	*0.52*
TOTAL OIL RCVY (BBL)	680,859	627,831	559,819	613,001	662,893	857,038	934,026	902,806
% OF TOTAL RCVY	*0.39*	*0.36*	*0.32*	*0.35*	*0.38*	*0.49*	*0.54*	*0.52*

TABLE 4.8–Continued

UNITS	YEAR 40	YEAR 41	YEAR 42	YEAR 43	YEAR 44	YEAR 45	YEAR 46	YEAR 47	YEAR 48
ADAIR "SA"	222,092	213,490	205,379	99,791	0	0	0	0	0
FUHRMAN MASCHO/BL10 "GBS	0	0	0	0	0	0	0	0	0
FUHRMAN MASCHO/BL9 "GBSA	0	0	0	0	0	0	0	0	0
JOHNSON /"GB" "SA"	0	0	0	0	0	0	0	0	0
JOHNSON/ "AB" "SA"	0	0	0	0	0	0	0	0	0
LEVELLAND/N CEN UN "SA"	0	0	0	0	0	0	0	0	0
MABEE/JE MABEE 'A' "SA"	0	0	0	0	0	0	0	0	0
MEANS "SA"	0	0	0	0	0	0	0	0	0
OWNBY "SA"	0	0	0	0	0	0	0	0	0
OWNBY/BL GILSTRAP"SA"	0	0	0	0	0	0	0	0	0
SABLE "SA"	0	0	0	0	0	0	0	0	0
SEMINLE/"SA"	0	0	0	0	0	0	0	0	0
SHAFTER "SA"	0	0	0	0	0	0	0	0	0
SLAUGHTER/IGOE SMITH "SA"	0	0	0	0	0	0	0	0	0
TRIPLE-N "GB"	0	0	0	0	0	0	0	0	0
WASSON/BENNET "SA"	651,031	631,385	612,592	594,606	577,380	560,873	545,046	529,862	216,441
WASSON/CORNELL "SA"	0	0	0	0	0	0	0	0	0
WASSON/DENVER "SA"	1,952,497	1,855,944	1,773,592	1,683,146	1,605,660	1,533,404	14,659,457	132,656	0
WASSON/ROBERTS "SA"	0	0	0	0	0	0	0	0	0
WASSON/WILLARD "SA"	0	0	0	0	0	0	0	0	0
WEST SEMINOLE "SA"	0	0	0	0	0	0	0	0	0
TOTAL OIL RCVY (BBL)	651,031	631,385	612,592	594,606	577,380	560,873	545,046	529,862	216,441
% OF TOTAL RCVY	*0.44*	*0.43*	*0.41*	*0.40*	*0.39*	*0.38*	*0.37*	*0.36*	*0.15*
TOTAL OIL RCVY (BBL)	873,123	844,875	817,971	694,396	577,380	560,873	545,046	529,862	216,441
% OF TOTAL RCVY	*0.51*	*0.49*	*0.47*	*0.40*	*0.33*	*0.33*	*0.32*	*0.31*	*0.13*
TOTAL OIL RCVY (BBL)	873,123	844,875	817,971	694,396	577,380	560,873	545,046	529,862	216,441
% OF TOTAL RCVY	*0.50*	*0.49*	*0.47*	*0.40*	*0.33*	*0.32*	*0.31*	*0.30*	*0.12*

TABLE 4.9–INCREMENTAL OIL PROD. REVENUE PER YEAR FOR CLEARFORK RESERVOIRS

IORC UNITS (BBL/Year, Million Dollars/year)

PRICE/BBL		TOT RCVY	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7
	TOTAL OIL RCVY	194963992.7							
@$18.00/BBL	*TOTAL OIL RCVY/YR*		1,246,507	4,716,951	6,332,261	7,353,605	8,503,007	9957927.4	10,425,594
	% OF TOTAL RCVY	*100.00*	*0.64*	*2.42*	*3.25*	*3.77*	*4.36*	*5.11*	*5.35*
	TOTAL REVENUE	*$3,509*	*$22*	*$85*	*$114*	*$132*	*$153*	*$179*	*$188*
	TOTAL OIL RCVY	195168402.1							
@$20.00/BBL	*TOTAL OIL RCVY/YR*		1,255,777	4,720,332	6,340,588	7,368,571	8,538,324	9990756.4	10,455,713
	% OF TOTAL RCVY	100.00	0.64	2.42	3.25	3.78	4.37	5.12	5.36
	TOTAL REVENUE	*$3,513*	*$25*	*$94*	*$127*	*$147*	*$171*	*$200*	*$209*
	TOTAL OIL RCVY	207,841,040							
@$22.00/BBL	*TOTAL OIL RCVY/YR*	207,841,040	1,566,639	5,332,789	7,220,406	8,315,369	9,359,878	10,821,856	11,487,869
	% OF TOTAL RCVY	100.00	0.75	2.57	3.47	4.00	4.50	5.21	5.53
	TOTAL REVENUE	*$3,741*	*$34*	*$117*	*$159*	*$183*	*$206*	*$238*	*$253*
RESERVOIRS IN PERMIAN BASIN									
	1245 MMSTB * 89.02% =	1,108,299,000							
	TOTAL OIL RCVY	1,108,299,000							
@$18.00/BBL	TOTAL OIL RCVY /YR		7,085,938	26,814,141	35,996,589	41,802,557	48,336,483	56,607,176	59,265,697
	% OF TOTAL RCVY	100	0.64	2.42	3.25	3.77	4.36	5.11	5.35
	TOTAL REVENUE	*$19,949*	*$128*	*$483*	*$648*	*$752*	*$870*	*$1,019*	*$1,067*
	1245 MMSTB * 89.12% =	1,109,544,000							
	TOTAL OIL RCVY	1,109,544,000							
@$20.00/BBL	TOTAL OIL RCVY /YR		7,139,165	26,835,368	36,046,621	41,890,767	48,540,879	56,798,046	59,441,352
	% OF TOTAL RCVY	100.00	0.64	2.42	3.25	3.78	4.37	5.12	5.36
	TOTAL REVENUE	*$22,191*	*$143*	*$537*	*$721*	*$838*	*$971*	*$1,136*	*$1,189*
	1245 MMSTB * 94.90%=	1,181,505,000							
	TOTAL OIL RCVY	1,181,505,000							
@$22.00/BBL	TOTAL OIL RCVY /YR		8,905,806	30,315,077	41,045,530	47,270,021	53,207,697	61,518,541	65,304,596
	% OF TOTAL RCVY	100.00	0.75	2.57	3.47	4.00	4.50	5.21	5.53
	TOTAL REVENUE	*$25,993*	*$196*	*$667*	*$903*	*$1,040*	*$1,171*	*$1,353*	*$1,437*

TABLE 4.9– Continued

(BBL/Year, Million Dollars/year)

	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16
TOTAL OIL RCVY									
TOTAL OIL RCVY/YR	10,320.870	9,766,129	9,248,389	8,825,021	8,515,302	7818465	7,505,486	7,961,960	8004486.73
% OF TOTAL RCVY	*5.29*	*5.01*	*4.74*	*4.53*	*4.37*	*4.01*	*3.85*	*4.08*	*4.11*
TOTAL REVENUE	*$186*	*$176*	*$166*	*$159*	*$153*	*$141*	*$135*	*$143*	*$144*
TOTAL OIL RCVY									
TOTAL OIL RCVY/YR	10,348,828	9,792,141	9,264,620	8,825,021	8,515,302	7818465	7,505,486	7,961,960	8004486.73
% OF TOTAL RCVY	5.30	5.02	4.75	4.52	4.36	4.01	3.85	4.08	4.10
TOTAL REVENUE	*$207*	*$196*	*$185*	*$177*	*$170*	*$156*	*$150*	*$159*	*$160*
TOTAL OIL RCVY									
TOTAL OIL RCVY/YR	11,391,468	10,599,679	10,017,045	9,500,080	9,127,640	8,420,276	8,094,408	8,430,986	8,370,481
% OF TOTAL RCVY	5.48	5.10	4.82	4.57	4.39	4.05	3.89	4.06	4.03
TOTAL REVENUE	*$251*	*$233*	*$220*	*$209*	*$201*	*$185*	*$178*	*$185*	*$184*
TOTAL OIL RCVY									
TOTAL OIL RCVY /YR	58,670,370	55,516,871	52,573,711	50,167,015	48,406,379	44,445,114	42,665,942	45,260,833	45,502,580
% OF TOTAL RCVY	5.29	5.01	4.74	4.53	4.37	4.01	3.85	4.08	4.11
TOTAL REVENUE	*$1,056*	*$999*	*$946*	*$903*	*$871*	*$800*	*$768*	*$815*	*$819*
TOTAL OIL RCVY									
TOTAL OIL RCVY /YR	58,833,704	55,668,904	52,669,914	50,170,769	48,410,000	44,448,440	42,669,134	45,264,219	45,505,984
% OF TOTAL RCVY	5.30	5.02	4.75	4.52	4.36	4.01	3.85	4.08	4.10
TOTAL REVENUE	*$1,177*	*$1,113*	*$1,053*	*$1,003*	*$968*	*$889*	*$853*	*$905*	*$910*
TOTAL OIL RCVY									
TOTAL OIL RCVY /YR	64,756,586	60,255,538	56,943,466	54,004,698	51,887,503	47,866,380	46,013,931	47,927,260	47,583,310
% OF TOTAL RCVY	5.48	5.10	4.82	4.57	4.39	4.05	3.89	4.06	4.03
TOTAL REVENUE	*$1,425*	*$1,326*	*$1,253*	*$1,188*	*$1,142*	*$1,053*	*$1,012*	*$1,054*	*$1,047*

TABLE 4.9–Continued

(BBL/Year, Million Dollars/year)

	YEAR 17	YEAR 18	YEAR 19	YEAR 20	YEAR 21	YEAR 22	YEAR 23	YEAR 24	YEAR 25
TOTAL OIL RCVY									
TOTAL OIL RCVY/YR	6,645,635	6,664,059	6,308,358	5,493,125	4893404.33	4,270,044	3,895,802	3,407,341	3,473,037
% OF TOTAL RCVY	*3.41*	*3.42*	*3.24*	*2.82*	*2.51*	*2.19*	*2.00*	*1.75*	*1.78*
TOTAL REVENUE	*$120*	*$120*	*$114*	*$99*	*$88*	*$77*	*$70*	*$61*	*$63*
TOTAL OIL RCVY									
TOTAL OIL RCVY/YR	6,645,635	6,664,059	6,308,358	5,493,125	4893404.33	4,270,044	3,895,802	3,407,341	3,473,037
% OF TOTAL RCVY	3.41	3.41	3.23	2.81	2.51	2.19	2.00	1.75	1.78
TOTAL REVENUE	*$133*	*$133*	*$126*	*$110*	*$98*	*$85*	*$78*	*$68*	*$69*
TOTAL OIL RCVY									
TOTAL OIL RCVY/YR	6.977.290	7,015,480	6,662,437	5,757,020	4,914,493	4.270,044	3,895,802	3,407,341	3,473,037
% OF TOTAL RCVY	3.36	3.38	3.21	2.77	2.36	2.05	1.87	1.64	1.67
TOTAL REVENUE	*$154*	*$154*	*$147*	*$127*	*$108*	*$94*	*$86*	*$75*	*$76*
TOTAL OIL RCVY									
TOTAL OIL RCVY /YR	37.778.006	37,882,737	35,860,709	31,226,407	27,817,214	24,273,6	22,146,208	19,369,486	19,742,946
% OF TOTAL RCVY	3.41	3.42	3.24	2.82	2.51	2.1	2.00	1.75	1.78
TOTAL REVENUE	*$680*	*$682*	*$645*	*$562*	*9501*	*$437*	*$399*	*$349*	*$355*
TOTAL OIL RCVY									
TOTAL OIL RCVY /YR	37.780.833	37.885,571	35,863.392	31,228.743	27,819,295	24,275,456	22,147,865	19,370,935	19,744,423
% OF TOTAL RCVY	3.41	3.41	3.23	2.81	2.51	2.19	2.00	1.75	1.78
TOTAL REVENUE	*$756*	*$758*	*$717*	*$625*	*$556*	*$486*	*$443*	*$387*	*$395*
TOTAL OIL RCVY									
TOTAL OIL RCVY /YR	39.663.499	39,880,594	37,873,668	32,726,685	27,937,204	24,273,736	22,146,296	19,369,563	19,743,025
% OF TOTAL RCVY	3.36	3.38	3.21	2.77	2.36	2.05	1.87	1.64	1.67
TOTAL REVENUE	*$873*	*$877*	*$833*	*$720*	*$615*	*$534*	*$487*	*$426*	*$434*

TABLE 4.9--Continued

(BBL/Year, Million Dollars/year)

YEAR 26	YEAR 27	YEAR 28	YEAR 29	YEAR 30	YEAR 31	YEAR 32	YEAR 33	YEAR34	YEAR 35	YEAR 36
3,425,988	3,164,766	2,715,220	2386821.93	2,193,033	2,015,031	1809665.9	1,608,056	1,479,412	1,361,059	1,252,174
1.76	*1.62*	*1.39*	*1.22*	*1.12*	*1.03*	*0.93*	*0.82*	*0.76*	*0.70*	*0.64*
$62	*$57*	*$49*	*$43*	*$39*	*$36*	*$33*	*$29*	*$27*	*$24*	*$23*
3,425,988	3,164,766	2,715,220	2386821.93	2,193,033	2,015,031	1809665.9	1,608,056	1,479,412	1,361,059	1,252,174
1.76	1.62	1.39	1.22	1.12	1.03	0.93	0.82	0.76	0.70	0.64
$69	*$63*	*$54*	*$48*	*$44*	*$40*	*$36*	*$32*	*$30*	*$27*	*$25*
3,425,988	3,164,766	2,715,220	2,386,822	2,193,033	2,015,031	1,809,666	1,608,056	1,479,412	1,361,059	1,252,174
1.65	1.52	1.31	1.15	1.06	0.97	0.87	0.77	0.71	0.65	0.60
$75	*$70*	*$60*	*$53*	*$48*	*$44*	*$40*	*$35*	*$33*	*$30*	*$28*
19,475,486	19,475,486	17,990,536	15,435,034	13,568,210	12,466,590	11,454,716	10,287,289	9,141,212	8,409,915	7,737,122
1.76	1.76	1.62	1.39	1.22	1.12	1.03	0.93	0.82	0.76	0.70
$351	*$351*	*$324*	*$278*	*$244*	*$224*	*$206*	*$185*	*$165*	*$151*	*$139*
19,476,943	19,476,943	17,991,882	15,436,189	13,569,225	12,467,522	11,455,573	10,288,058	9,141,896	8,410,544	7,737,701
1.76	1.76	1.62	1.39	1.22	1.12	1.03	0.93	0.82	0.76	0.70
$390	*$390*	*$360*	*$309*	*$271*	*$249*	*$229*	*$206*	*$183*	*$168*	*$155*
19,475,564	19,475,564	17,990,607	15,435,095	13,568,264	12,466,639	11,454,761	10,287,330	9,141,249	8,409,949	7,737,153
1.65	1.65	1.52	1.31	1.15	1.06	0.97	0.87	0.77	0.71	0.65
$428	*$428*	*$396*	*$340*	*$299*	*$274*	*$252*	*$226*	*$201*	*$185*	*$170*

TABLE 4.10–INCREMENTAL OIL PROD. REVENUE PER YEAR FOR SAN ANDRES RESERVOIRS

IORC UNITS		(BBL/Year,	Million Dollars/year)						
PRICE / BBL		**TOT RCVY**	**YEAR 1**	**YEAR 2**	**YEAR 3**	**YEAR 4**	**YEAR 5**	**YEAR 6**	**YEAR 7**
	TOTAL OIL RCVY	**148268998.2**							
@$18.00/BBL	**TOTAL OIL RCVY (BBL)**	**148,268,998**	1,203,029	5,608,698	9,060,251	11,181,030	13,570,888	13,151,411	11,807,762
	% OF TOTAL RCVY	**100.00**	0.81	3.78	6.11	7.54	9.15	8.87	7.96
	TOTAL REVENUE	***$2,669***	*$22*	*$101*	*$163*	*$201*	*$244*	*$237*	*$213*
	TOTAL OIL RCVY	**172469741.8**							
@$20.00/BBL	**TOTAL OIL RCVY (BBL)**	**172,469,742**	1,616,471	7,271,267	11,066,411	13,323,216	15,469,965	14,834,617	13,193,523
	% OF TOTAL RCVY	**100.00**	0.94	4.22	6.42	7.72	8.97	8.60	7.65
	TOTAL REVENUE	***$3,449***	*$33*	*$145*	*$221*	*$266*	*$309*	*$297*	*$264*
	TOTAL OIL RCVY	**174,193,191**							
@$22.00/BBL	**TOTAL OIL RCVY (BBL)**	**174,193,191**	1,644,611	7,383,643	11,276,574	13,579,713	15,708,811	15,045,853	13,349,419
	% OF TOTAL RCVY	**100.00**	0.94	4.24	6.47	7.80	9.02	8.64	7.66
	TOTAL REVENUE	***$3,832***	*$36*	*$162*	*$248*	*$299*	*$346*	*$331*	*$294*
RESERVOIRS IN PERMIAN BASIN									
	1245 MMSTB * 85.23% =	**2,936,173,500**							
	TOTAL OIL RCVY	**2,936,173,500**							
@$18.00/BBL	**TOTAL OIL RCVY /YR**		23,823,606	111,069,135	179,420,307	221,418,127	268,744,522	260,437,613	233,829,312
	% OF TOTAL RCVY	**100.00**	0.81	3.78	6.11	7.54	9.15	8.87	7.96
	TOTAL REVENUE	***$52,851***	*$429*	*$1,999*	*$3,230*	*$3,986*	*$4,837*	*$4,688*	*$4,209*
	1245 MMSTB * 99.12% =	**3,414,684,000**						**56090026.13**	
@$20.00/BBL	**TOTAL OIL RCVY /YR**		32,004,084	143,961,935	219,101,026	263,782,930	306,285,852	293,706,752	261,215,169
	% OF TOTAL RCVY	**100.00**	0.94	4.22	6.42	7.72	8.97	8.60	7.65
	TOTAL REVENUE	***$68,294***	*$640*	*$2,879*	*$4,382*	*$5,276*	*$6,126*	*$5,874*	*$5,224*
	1245 MMSTB * 100% =	**3,445,000,000**						**297,560,222**	
@$22.00/BBL	**TOTAL OIL RCVY /YR**		32,525,291	146,025,512	223,015,599	268,564,522	310,671,466	297,560,222	264,010,023
	% OF TOTAL RCVY	**100.00**	0.94	4.24	6.47	7.80	9.02	8.64	7.66
	TOTAL REVENUE	***$75,790***	*$716*	*$3,213*	*$4,906*	*$5,908*	*$6,835*	*$6,546*	*$5,808*

TABLE 4.10–Continued

(BBL/Year, Million Dollars/year)

	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13	YEAR 14
TOTAL OIL RCVY							
TOTAL OIL RCVY (BBL)	9,914,652	8,014,478	6,684,847	5,876,729	4,946,560	4,458,505	3,768,780
% OF TOTAL RCVY	6.69	5.41	4.51	3.96	3.34	3.01	2.54
TOTAL REVENUE	*$178*	*$144*	*$120*	*$106*	*$89*	*$80*	*$68*
TOTAL OIL RCVY							
TOTAL OIL RCVY (BBL)	11,101,240	9,031,945	7,631,850	6,703,644	5,622,395	5,047,396	4,310,528
% OF TOTAL RCVY	6.44	5.24	4.43	3.89	3.26	2.93	2.50
TOTAL REVENUE	*$222*	*$181*	*$153*	*$134*	*$112*	*$101*	*$86*
TOTAL OIL RCVY							
TOTAL OIL RCVY (BBL)	11,243,441	9,129,144	7,709,345	6,778,656	5,689,627	5,098,552	4,310,528
% OF TOTAL RCVY	6.45	5.24	4.43	3.89	3.27	2.93	2.47
TOTAL REVENUE	*$247*	*$201*	*$170*	*$149*	*$125*	*$112*	*$95*
1245 MMSTB * 85.23% =							
TOTAL OIL RCVY							
TOTAL OIL RCVY /YR	196,340,022	158,710,851	132,380,139	116,376,964	97,956,819	88,291,852	74,633,206
% OF TOTAL RCVY	6.69	5.41	4.51	3.96	3.34	3.01	2.54
TOTAL REVENUE	*$3,534*	*$2,857*	*$2,383*	*$2,095*	*$1,763*	*$1,589*	*$1,343*
1245 MMSTB * 99.12% =							
TOTAL OIL RCVY /YR	219,790,601	178,821,160	151,101,027	132,723,728	111,316,344	99,932,098	85,343,040
% OF TOTAL RCVY	6.44	5.24	4.43	3.89	3.26	2.93	2.50
TOTAL REVENUE	*$4,396*	*$3,576*	*$3,022*	*$2,654*	*$2,226*	*$1,999*	*$1,707*
1245 MMSTB * 100% =							
TOTAL OIL RCVY /YR	222,360,325	180,546,101	152,466,878	134,060,753	112,523,148	100,833,514	85,248,855
% OF TOTAL RCVY	6.45	5.24	4.43	3.89	3.27	2.93	2.47
TOTAL REVENUE	*$4,892*	*$3,972*	*$3,354*	*$2,949*	*$2,476*	*$2,218*	*$1,875*

TABLE 4.10--Continued

(BBL/Year, Million Dollars/year)

	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	YEAR 21	YEAR 22	YEAR 23
TOTAL OIL RCVY									
TOTAL OIL RCVY (BBL)	3,382,476	3,339,094	3,069,473	2,298,213	1,861,006	1,701,130	1,520,777	1,351,043	1,376,358
% OF TOTAL RCVY	2.28	2.25	2.07	1.55	1.26	1.15	1.03	0.91	0.93
TOTAL REVENUE	*$61*	*$60*	*$55*	*$41*	*$33*	*$31*	*$27*	*$24*	*$25*
TOTAL OIL RCVY									
TOTAL OIL RCVY (BBL)	3,871,959	3,787,861	3,481,075	2,677,376	2,211,321	2,025,687	1,822,245	1,631,743	1,638,314
% OF TOTAL RCVY	2.25	2.20	2.02	1.55	1.28	1.17	1.06	0.95	0.95
TOTAL REVENUE	*$77*	*$76*	*$70*	*$54*	*$44*	*$41*	*$36*	*$33*	*$33*
TOTAL OIL RCVY									
TOTAL OIL RCVY (BBL)	3,871,959	3,787,861	3,481,075	2,677,376	2,211,321	2,025,687	1,822,245	1,631,743	1,638,314
% OF TOTAL RCVY	2.22	2.17	2.00	1.54	1.27	1.16	1.05	0.94	0.94
TOTAL REVENUE	*$85*	*$83*	*$77*	*$59*	*$49*	*$45*	*$40*	*$36*	*$36*
1245 MMSTB * 85.23% = TOTAL OIL RCVY									
TOTAL OIL RCVY /YR	66,983,231	66,124,126	60,784,828	45,511,557	36,853,532	33,687,511	30,115,965	26,754,722	27,256,039
% OF TOTAL RCVY	2.28	2.25	2.07	1.55	1.26	1.15	1.03	0.91	0.93
TOTAL REVENUE	*$1,206*	*$1,190*	*$1,094*	*$819*	*$663*	*$606*	*$542*	*$482*	*$491*
1245 MMSTB * 99.12% =									
TOTAL OIL RCVY /YR	76,659,921	74,994,876	68,920,901	53,008,678	43,781,373	40,106,046	36,078,156	32,306,456	32,436,562
% OF TOTAL RCVY	2.25	2.20	2.02	1.55	1.28	1.17	1.06	0.95	0.95
TOTAL REVENUE	*$1,533*	*$1,500*	*$1,378*	*$1,060*	*$876*	*$802*	*$722*	*$646*	*$649*
1245 MMSTB * 100% =									
TOTAL OIL RCVY /YR	76,575,319	74,912,111	68,844,839	52,950,178	43,733,056	40,061,784	36,038,339	32,270,802	32,400,765
% OF TOTAL RCVY	2.22	2.17	2.00	1.54	1.27	1.16	1.05	0.94	0.94
TOTAL REVENUE	*$1,685*	*$1,648*	*$1,515*	*$1,165*	*$962*	*$881*	*$793*	*$710*	*$713*

TABLE 4.10–Continued

(BBL/Year, Million Dollars/year)

	YEAR 24	YEAR 25	YEAR 26	YEAR 27	YEAR 28	YEAR 29	YEAR 30	YEAR 31
TOTAL OIL RCVY								
TOTAL OIL RCVY (BBL)	1,661,115	1,549,929	1,450,302	1,360,673	1,279,734	1,206,380	777,982	717,643
% OF TOTAL RCVY	1.12	1.05	0.98	0.92	0.86	0.81	0.52	0.48
TOTAL REVENUE	*$30*	*$28*	*$26*	*$24*	*$23*	*$22*	*$14*	*$13*
TOTAL OIL RCVY								
TOTAL OIL RCVY (BBL)	1,906,101	1,779,506	1,665,846	1,563,406	1,470,741	1,386,630	948,339	878,884
% OF TOTAL RCVY	1.11	1.03	0.97	0.91	0.85	0.80	0.55	0.51
TOTAL REVENUE	*$38*	*$36*	*$33*	*$31*	*$29*	*$28*	*$19*	*$18*
TOTAL OIL RCVY								
TOTAL OIL RCVY (BBL)	1,906,101	1,779,506	1,665,846	1,563,406	1,470,741	1,386,630	948,339	878,884
% OF TOTAL RCVY	1.09	1.02	0.96	0.90	0.84	0.80	0.54	0.50
TOTAL REVENUE	*$42*	*$39*	*$37*	*$34*	*$32*	*$31*	*$21*	*$19*
1245 MMSTB * 85.23% =								
TOTAL OIL RCVY								
TOTAL OIL RCVY /YR	32,895,090	30,693,279	28,720,349	26,945,426	25,342,592	23,889,968	15,406,383	14,211,497
% OF TOTAL RCVY	1.12	1.05	0.98	0.92	0.86	0.81	0.52	0.48
TOTAL REVENUE	*$592*	*$552*	*$517*	*$485*	*$456*	*$430*	*$277*	*$256*
1245 MMSTB * 99.12% =								
TOTAL OIL RCVY /YR	37,738,411	35,231,982	32,981,662	30,953,477	29,118,830	27,453,524	18,775,915	17,400,807
% OF TOTAL RCVY	1.11	1.03	0.97	0.91	0.85	0.80	0.55	0.51
TOTAL REVENUE	*$755*	*$705*	*$660*	*$619*	*$582*	*$549*	*$376*	*$348*
1245 MMSTB * 100% =								
TOTAL OIL RCVY /YR	37,696,762	35,193,099	32,945,263	30,919,316	29,086,694	27,423,226	18,755,194	17,381,604
% OF TOTAL RCVY	1.09	1.02	0.96	0.90	0.84	0.80	0.54	0.50
TOTAL REVENUE	*$829*	*$774*	*$725*	*$680*	*$640*	*$603*	*$413*	*$382*

TABLE 4.10–Continued

(BBL/Year, Million Dollars/year)

	YEAR 32	YEAR 33	YEAR34	YEAR 35	YEAR 36	YEAR 37	YEAR 38	YEAR 39
TOTAL OIL RCVY								
TOTAL OIL RCVY (BBL)	528,034	466,589	422,000	411,141	400,620	605,776	693,095	671,582
% OF TOTAL RCVY	0.36	0.31	0.28	0.28	0.27	0.41	0.47	0.45
TOTAL REVENUE	*$10*	*$8*	*$8*	*$7*	*$7*	*$11*	*$12*	*$12*
TOTAL OIL RCVY								
TOTAL OIL RCVY (BBL)	680,859	627,831	559,819	613,001	662,893	857,038	934,026	902,806
% OF TOTAL RCVY	0.39	0.36	0.32	0.36	0.38	0.50	0.54	0.52
TOTAL REVENUE	*$14*	*$13*	*$11*	*$12*	*$13*	*$17*	*$19*	*$18*
TOTAL OIL RCVY								
TOTAL OIL RCVY (BBL)	680,859	627,831	559,819	613,001	662,893	857,038	934,026	902,806
% OF TOTAL RCVY	0.39	0.36	0.32	0.35	0.38	0.49	0.54	0.52
TOTAL REVENUE	*$15*	*$14*	*$12*	*$13*	*$15*	*$19*	*$21*	*$20*
1245 MMSTB * 85.23% =								
TOTAL OIL RCVY								
TOTAL OIL RCVY /YR	10,456,674	9,239,871	8,356,869	8,141,830	7,933,483	11,996,189	13,725,373	13,299,356
% OF TOTAL RCVY	0.36	0.31	0.28	0.28	0.27	0.41	0.47	0.45
TOTAL REVENUE	*$188*	*$166*	*$150*	*$147*	*$143*	*$216*	*$247*	*$239*
1245 MMSTB * 99.12% =								
TOTAL OIL RCVY /YR	13,480,146	12,430,255	11,083,716	12,136,653	13,124,444	16,968,278	18,492,539	17,874,427
% OF TOTAL RCVY	0.39	0.36	0.32	0.36	0.38	0.50	0.54	0.52
TOTAL REVENUE	*$270*	*$249*	*$222*	*$243*	*$262*	*$339*	*$370*	*$357*
1245 MMSTB * 100% =								
TOTAL OIL RCVY /YR	13,465,269	12,416,537	11,071,484	12,123,259	13,109,960	16,949,552	18,472,131	17,854,701
% OF TOTAL RCVY	0.39	0.36	0.32	0.35	0.38	0.49	0.54	0.52
TOTAL REVENUE	*$296*	*$273*	*$244*	*$267*	*$288*	*$373*	*$406*	*$393*

TABLE 4.10–Continued

(BBL/Year, Million Dollars/year)

	YEAR 40	YEAR 41	YEAR 42	YEAR43	YEAR 44	YEAR 45	YEAR 46	YEAR 47	YEAR 48
TOTAL OIL RCVY									
TOTAL OIL RCVY (BBL)	651,031	631,385	612,592	594,606	577,380	560,873	545,046	529,862	216,441
% OF TOTAL RCVY	0.44	0.43	0.41	0.40	0.39	0.38	0.37	0.36	0.15
TOTAL REVENUE	*$12*	*$11*	*$11*	*$11*	*$10*	*$10*	*$10*	*$10*	*$4*
TOTAL OIL RCVY									
TOTAL OIL RCVY (BBL)	873,123	844,875	817,971	694,396	577,380	560,873	545,046	529,862	216,441
% OF TOTAL RCVY	0.51	0.49	0.47	0.40	0.33	0.33	0.32	0.31	0.13
TOTAL REVENUE	*$17*	*$17*	*$16*	*$14*	*$12*	*$11*	*$11*	*$11*	*$4*
TOTAL OIL RCVY									
TOTAL OIL RCVY (BBL)	873,123	844.875	817,971	694,396	577,380	560,873	545,046	529,862	216,441
% OF TOTAL RCVY	0.50	0.49	0.47	0.40	0.33	0.32	0.31	0.30	0.12
TOTAL REVENUE	*$19*	*$19*	*$18*	*$15*	*$13*	*$12*	*$12*	*$12*	*$5*
1245 MMSTB * 85.23% =									
TOTAL OIL RCVY									
TOTAL OIL RCVY /YR	12,892,373	12,503,321	12,131,176	11,774,984	11,433,857	11,106,969	10,793,548	10,492,875	4,286,184
% OF TOTAL RCVY	0.44	0.43	0.41	0.40	0.39	0.38	0.37	0.36	0.15
TOTAL REVENUE	*$232*	*$225*	*$218*	*$212*	*$206*	*$200*	*$194*	*$189*	*$77*
1245 MMSTB * 99.12% =									
TOTAL OIL RCVY /YR	17,286,729	16,727,462	16,194,804	13,748,176	11,431,389	11,104,572	10,791,219	10,490,610	4,285,259
% OF TOTAL RCVY	0.51	0.49	0.47	0.40	0.33	0.33	0.32	0.31	0.13
TOTAL REVENUE	*$3,457*	*$335*	*$324*	*$275*	*$229*	*$222*	*$216*	*$210*	*$86*
1245 MMSTB * 100% =									
TOTAL OIL RCVY /YR	17,267,652	16,709,001	16,176,931	13,733,004	11,418,773	11,092,316	10,779,309	10,479,033	4,280,529
% OF TOTAL RCVY	0.50	0.49	0.47	0.40	0.33	0.32	0.31	0.30	0.12
TOTAL REVENUE	*$380*	*$368*	*$356*	*$302*	*$251*	*$244*	*$237*	*$231*	*$94*

CHAPTER V

OIL PRODUCTION CREATES JOBS

5.1 General Description

Now that the amount of incremental oil production revenue is computed, the link between revenue and jobs is analyzed. The revenue for the IORC units is computed on an annual basis as shown in tables on p.58 and p.62, therefore, the jobs will be computed per year. Similarly, the projected incremental oil production revenue for the Permian Basin reservoirs are computed per year as shown in tables on p.58 and p.62, so, the number of jobs will be per year as well.

5.2 Jobs From Revenue

Tables on p.79 and p.84 show the number of jobs created from the incremental infill drilling recovery revenues by using the computations from the Texas Input/Output Model.[29] Table on p.79 shows the number of jobs created from the infill drilling recovery in the Clearfork reservoirs. Jobs created in assumption with the incremental infill drilling oil production is computed as follows. The revenue generated by the incremental recovery is multiplied by 7.3256 jobs per million dollars[29] to compute the number of jobs created in the oil industry. Next, the revenue is multiplied by 25.7044 jobs per million dollars[29] to find the quantity of oil industry jobs plus secondary jobs that will be created in the communities where the oil field workers reside. Secondary jobs are created when oil industry workers spend wages in the community. These wages create jobs for the community such as medical services and retail employment. For comparison, Mr. Dwane Phillips of Union Pacific Resources stated that his company creates 6 oil

industry jobs and 20 secondary jobs per every million dollars they spend in Brazos County.[40] Continuing on, the upper half of Tables on p.79 and p.84 show for the IORC units, the price of oil in millions of dollars and the amount of jobs created from incremental infill drilling. As shown in Fig. on p.75 the average number of jobs created by the IORC units per year is 2,600 jobs per year for 48 years. The total number of job-years that are created by the IORC units is 151,500 job-years. The lower half of Tables on p.79 and p.84 shows the same information for the extrapolated data on the Permian Basin Clearfork and San Andres reservoirs. As shown in Fig. on p.76, the average number of jobs created by the Permian Basin reservoirs per year is 30,500 for 48 years. The total number of job-years that could be created by the Permian Basin reservoirs is 1,462,000 job-years. In 1994, at $18.00/bbl, every $1.00 change in the oil price means a change of 1200 jobs. These job figures are compared to the total number of industrial jobs in the State of Texas which is 7,152,000 jobs per year. The oil industry employs 4.0% of Texas workers which is the third largest percent next to real estate at 4.4% and maintenance and repair at 4.1%.[29]

5.3 The Texas Input/Output Model

Mickey Wright[40] at the Texas Comptrollers points out that the Input/Output Model shows that crude oil and natural gas generates 7.3256 oil industry jobs per million dollars[29] produced at the well head, 13.8684 oil industry plus general industry jobs per million dollars[29] produced at the well head and 25.7044 oil industry plus general industry plus secondary jobs per million dollars[29] produced at the well head. The production of oil and gas includes the gross value of the product and excludes contracted drilling services. In the Texas Input/Output model, the output of oil and gas mining is estimated by multiplying volumes of production by yearly

average prices for 1986. The source of this data is the Texas Railroad Commission's report "Indicators May 1988,"[29] which provides volumes of production, and the Texas Comptroller's Office data files which lists prices.[29]

The Texas Input/Output Model table of employment multipliers, called "Effects in Jobs per Millions of Dollars", is included in appendix B for comparing the oil industry to other industries. For example, the automobile manufacturing industry (sector 80) accounts for 13,824 jobs in Texas and the petroleum industry (sector 11 through 15) accounts for 289,304 jobs. Almost 21 times more jobs than in the auto industry.[29]

5.4 The U.S. Department of Commerce Method

The Department of Commerce (DOC) Bureau of Economic Analysis has an Input/Output Model, but it differs from the State of Texas model in that the amount of jobs cannot be determined from this I-O model. However, the DOC model presents data in five tables. (1) the make of commodities by industries, (2) the use of commodities by industries, (3) the commodity-by-commodity direct requirements, (4) commodity-by-commodity total requirements, and (5) the industry-by-industry total requirements. The second part of the I-O model is a list of the amount of earnings per worker grouped into geographical regions.[39] This model is not used in this study.

5.5 Southwest Econometrics Model

A private Input/Output Model[25] which can be contracted is an econometrics model by Southwest Econometrics in Austin, Texas. The Bureau of Economic Geology contracted Southwest Econometerics services to conduct a study on a secondary incremental recovery project which included infill drilling and

to find the quantity of jobs created if the secondary infill drilling project is developed and produced. The results were included in a report to the Governor of Texas in September 1990.[25] The results were 13 oil industry jobs plus general industry jobs per million dollars produced at the well head. This number is very close to the number of jobs per million dollars found in the Texas Input/Output Model furnished in Appendix B. The I-O model is 13.8684 oil industry jobs plus general industry jobs per million dollars of gross revenue.

5.6 Types of Jobs Created by the Increased Revenues

Now that the number of jobs created from infill drilling is computed, the types of jobs that are created and their annual salaries are studied. According to the Bureau of Labor and Statistics, oil and gas industry workers earn $14.02/hr on the average compared to manufacturing which earns $9.91/hour on the average.[37]

Many job opportunities will be created within the exploration field in both the private and government sectors as the infill drilling projects are being put together. Paleontologists, hydrologists, mineralogists, seismologists, stratigraphers, geologists and geophysicists will be needed for underground mapping, sampling, and coring. The salary for a geologist with a BS degree starts at $18,400 per year, and with an MS degree, $22,500, and $32,600 with a Ph.D. In the federal government, a geologists average annual salary is $37,500 and geophysicists earn $40,900. Some secondary jobs which support exploration are drafters, engineering technicians, science technicians, engineers, surveyors, physicists, chemists, meteorologists, mathematicians, computer scientists, and cartographers.[20]

As the drilling rig moves in to drill new infill drilling wells, people working in the oil fields also benefit from the increase in activity. Drilling and production engineers along

with company representatives earn $33,000 per year. The regional manager drilling superintendent earns $47,000, the toolpusher at $39,000, driller $32,000, roughnecks, floorman and motorman at $22,000, and the derrickman at $24,000. Also, the crane operator earns $22,000, electrician and mechanics at $30,000, welders at $26,000, and roustabouts at $20,000 annually. Other jobs that benefit are pit diggers, truck drivers, rig movers, bit companies, pipe testers, logging companies, cementing companies, acidizing companies, blowout preventer crews and jobs clearing well sites.[20]

The jobs that bring oil and gas infill drilling wells on line benefit as well. The production engineer makes $33,000 and the reservoir engineers earn $40,000 annually. Other jobs are the mud loggers and refinery workers. The companies that will prosper are the logging company and crews, casing and pipe manufacturers, Christmas tree and valve companies, pumping units and rods, submersible pumps, workover units, tank rentals and pipeline construction.[20]

The jobs that are created for the people who maintain the new infill drilling oil wells are the pumpers or gaugers earning $20,000, laborers at $14,000, tank truck drivers, pipe line monitors, operators, pipeline construction workers, oil dispatchers, dock supervisors, compression station workers, distribution workers, construction and maintenance inspectors, oil pumpers, station engineers, barrel fillers, gas-transfer operators, and loaders.[20]

Some of the incremental infill recovery oil is sent to the petro-chemical refineries on the Gulf Coast. Jobs that are affected are process engineers and chemical engineers making $29,000 a year, refinery gaugers, petroleum refinery and control panel operators, gas plant operators, petroleum pump systems operators, and labor analysts.[20]

The jobs in the administration environment are administration personnel, computer programmers and operator specialists, and advertising personnel earning $27,000 per year

$32,800 and $35,400 respectively. Other jobs are computer analysts and systems engineers, accountants, comptrollers, public relations personnel, management personnel, sales personnel, wholesale, clerical personnel, customer service representatives, accountants, attorneys, statisticians, data processing specialists, and public relations, and marketing.[20] Support staff are health and safety engineering, biochemistry, plant pathology, toxicology, mathematics, statistics, research department R&D, chemists at $23,400 a year, science technicians, petroleum technicians, and scouts at $22,000 a year.[20]

5.7 Jobs for Petroleum Engineers

As the number of infill drilling projects increase, the need for petroleum engineers will increase. The Department of Labor Occupational Outlook Handbook[37] states that a 6% drop in employment will occur over the next fifteen years in the mining industry due to the continual drop in domestic oil production and the sharp rise in oil imports as shown in Fig. on p.77.[37] Infill drilling could help improve this economic situation. The handbook[37] states that 17,000 engineers out of 1,412,300 engineers or 1.2% in the United States are petroleum engineers as shown in Fig. on p.78. Most of these engineers are in the petroleum industry or allied fields. The number of degrees granted in engineering has declined recently with about 62,000 receiving engineering degrees in 1991. The Center for Education Statistics[37] said 1,719 Bachelor's of Science degrees in petroleum engineering were granted in the academic year of 1984-85 starting at $33,000 per year. During that same year, 265 or 15.4 % of petroleum engineers received their master's of science degrees starting at $33,100, while 24 or 1.4% earned doctorate degrees starting at $42,200.[20] Opportunities in Petroleum Careers[20] states employment of petroleum engineers is expected to grow slightly through the

year 2000.[20] Infill drilling would insure that this trend continues to grow.

As shown in table on p.90, petroleum engineers are the highest paid of all the engineering professions. In 1986, the average starting salary for a petroleum engineer[37] with a bachelor of science degree was $32,016. This is substantially higher than the $29,101 average starting salary for all other engineers.

5.8 Rules of Thumb in Creating Jobs

Rule of thumb methods are used to link oil production to jobs. One of these rule of thumb methods is from the Center for Energy and Economic Diversification at the University of Texas at the Permian Basin. Their rule of thumb is for every rig, one hundred new jobs are created. This rule of thumb can be correlated to our study by using appendix B. The cost of drilling a well as noted in Table 4.2 is $340,000 per well. If the assumption is made that one rig drills a well in 30.4 days, then one rig can earn an annual income of $4.08 million per year. Now adjust the income back to 1986 by dividing by a factor of 1.28 computes to $3.2 million per year in 1986 dollars. Go to the table in appendix B and the jobs per million dollars for oil and gas drilling is 33.3089 jobs per million dollars which computes to 106 jobs per drilling rig. This number could be used when following the rig count in the local papers. See Fig. 5.1 through 5.4 and Tables 5.1 through 5.3 as follows.

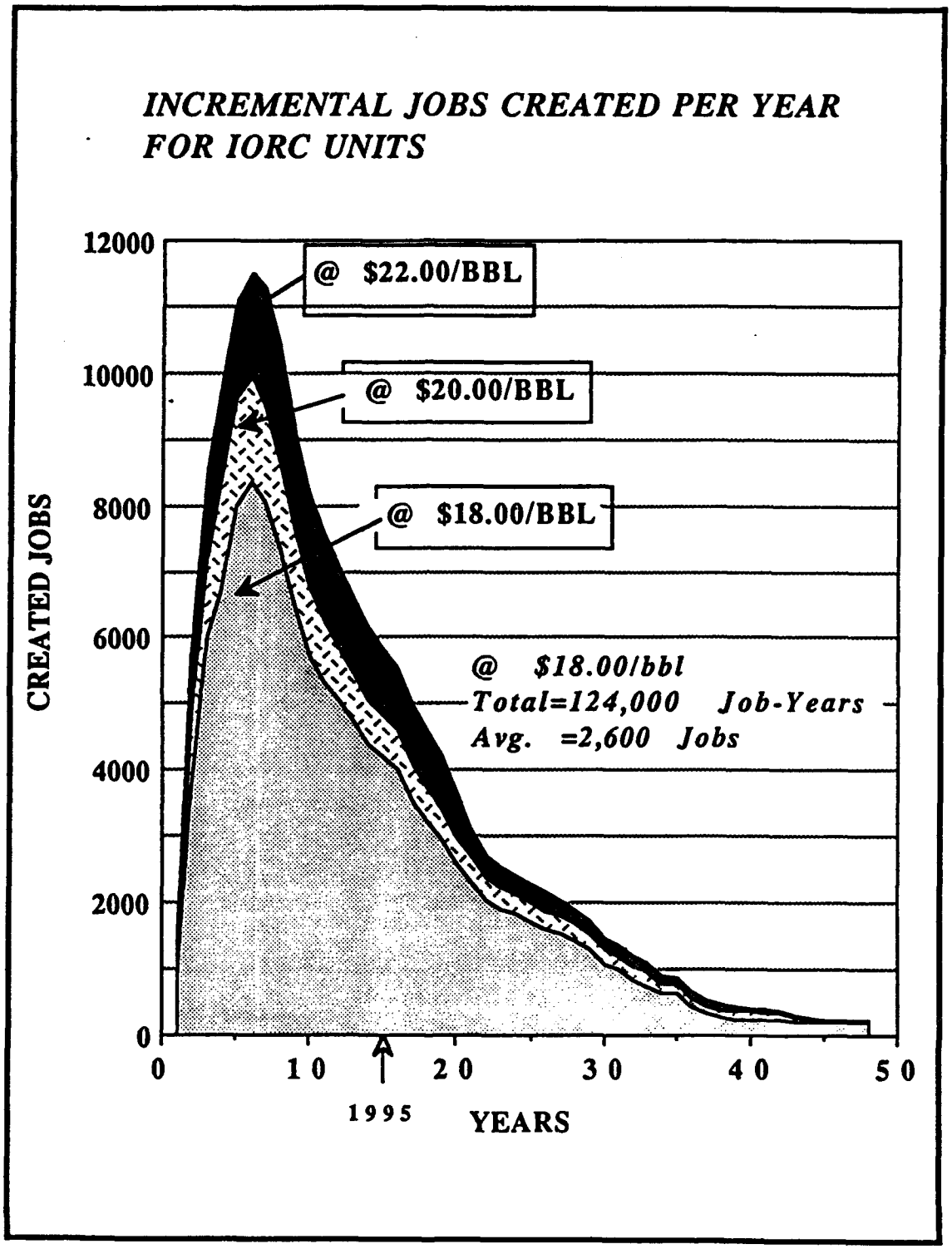

Fig. 5.1–Incremental jobs created per year from the combined revenue of the Clearfork and San Andres IORC units.

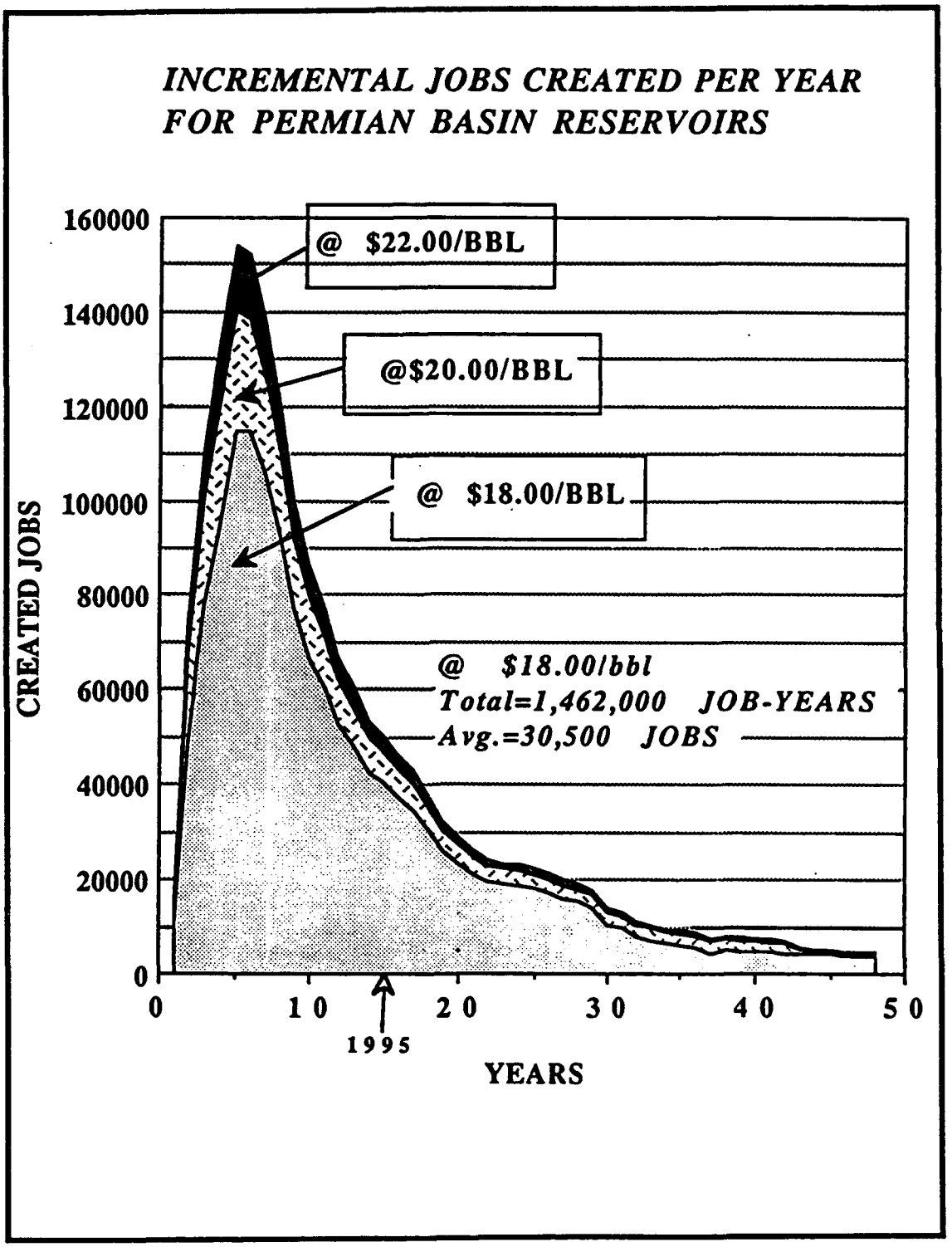

Fig. 5.2–Incremental jobs created per year from the combined revenue of the Clearfork and San Andres formations in the Permian Basin.

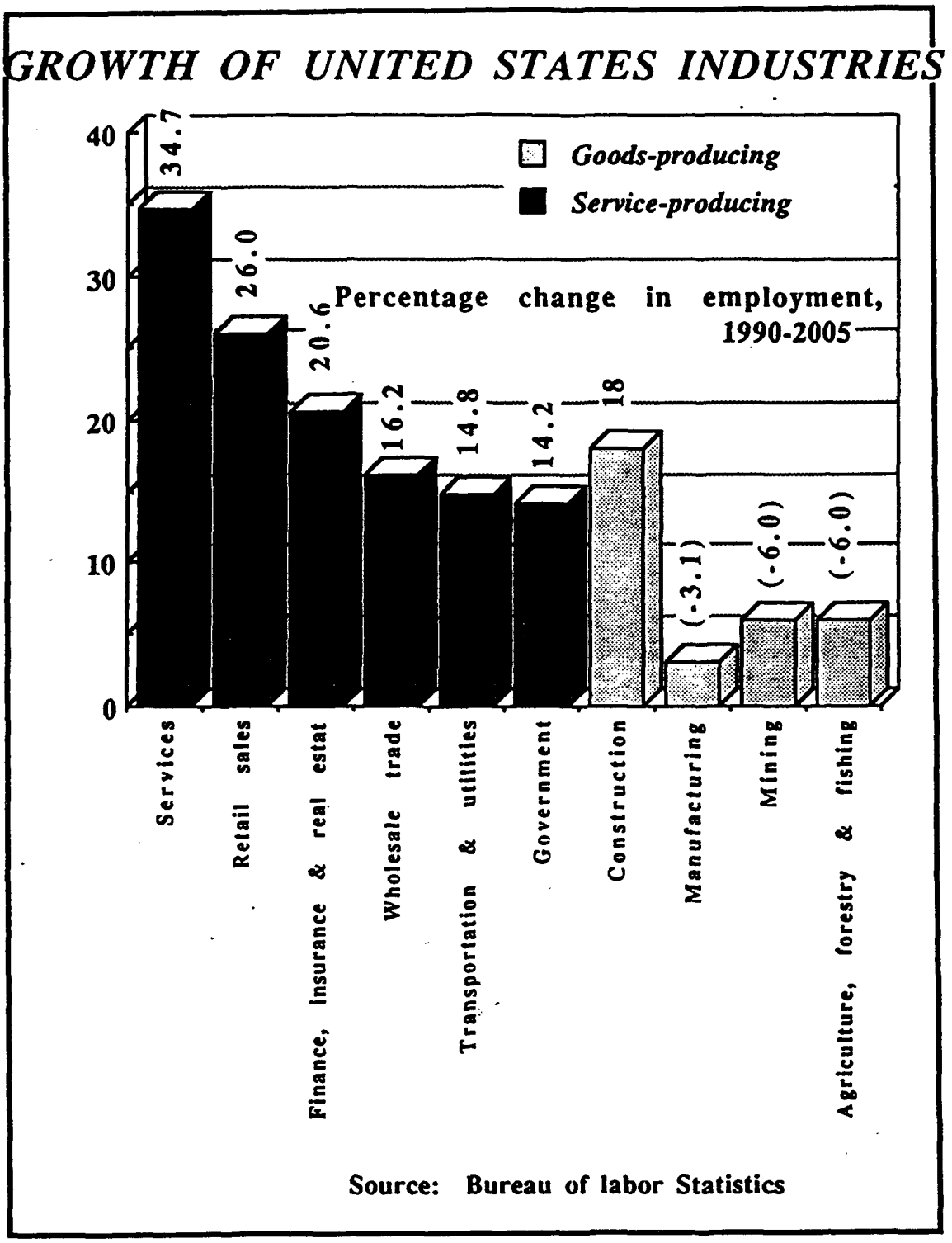

Fig. 5.3—Growth of industries in the United States.

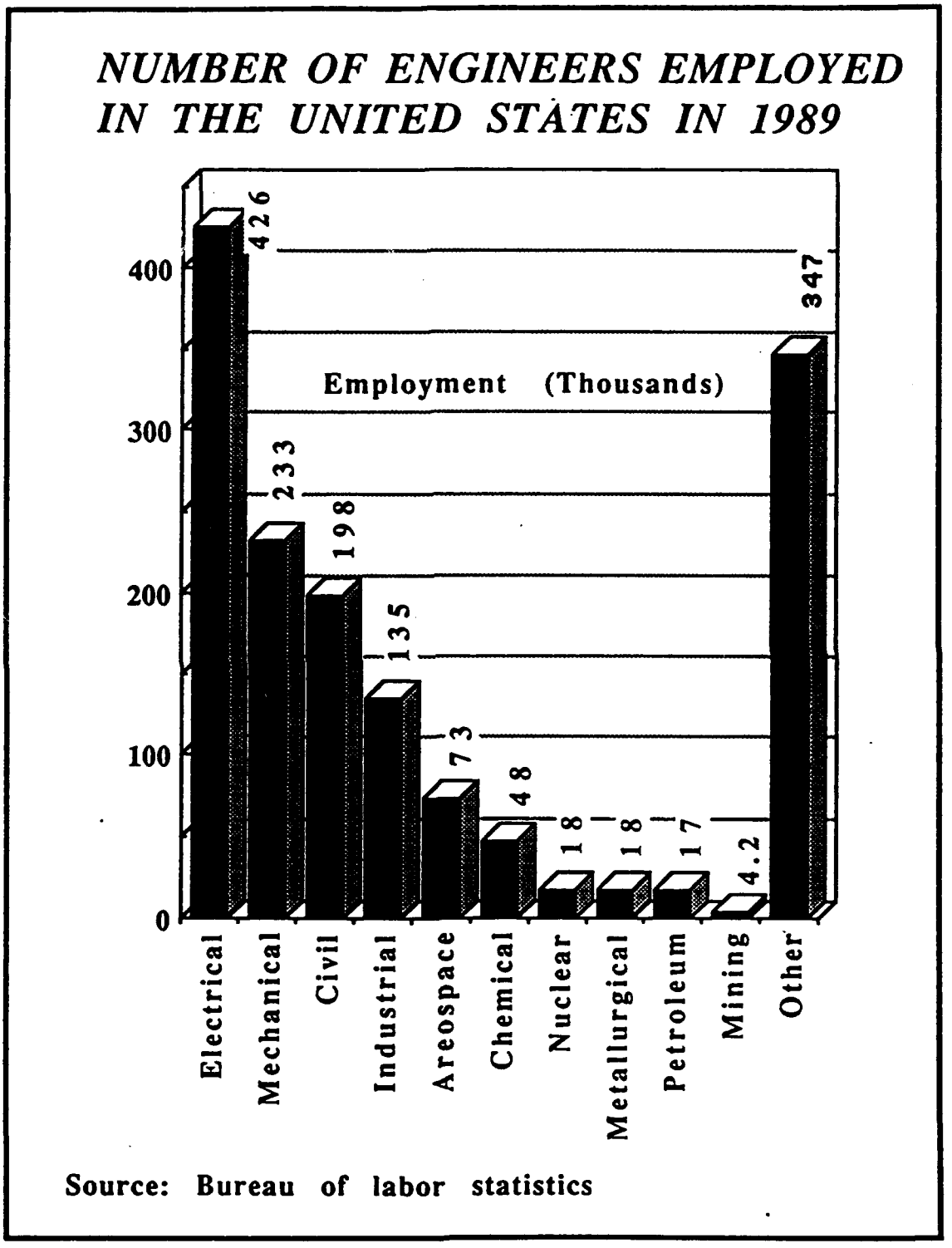

Fig. 5.4–Number of engineers employed in the United States.

TABLE 5.1–INCREMENTAL JOBS CREATED PER YEAR DUE TO CLEARFORK PRODUCTION

(Million Dollars/year, Jobs/Year)

IORC UNITS

PRICE PER BBL		TOTAL	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7
@$18.00/BBL	TOTAL REVENUE	$3,509	$22	$85	$114	$132	$153	$179	$188
	REVENUE ADJ . 1986	$2,742	$18	$66	$89	$103	$120	$140	$147
	PETRO. INDST. JOBS	*20,084*	*128*	*486*	*652*	*758*	*876*	*1,026*	*1,076*
	TOTAL JOBS	*70,473*	*451*	*1,705*	*2,289*	*2,658*	*3,074*	*3,599*	*3,775*
@$20.00/BBL	TOTAL REVENUE	$3,513	$25	$94	$127	$147	$171	$200	$209
	REVENUE ADJ . 1986	$2,745	$20	$74	$99	$115	$133	$156	$163
	PETRO. INDST. JOBS	*20,106*	*144*	*540*	*726*	*843*	*977*	*1,144*	*1,197*
	TOTAL JOBS	*70,547*	*504*	*1,896*	*2,547*	*2,959*	*3,429*	*4,013*	*4,199*
@$22.00/BBL	TOTAL REVENUE	$3,712	$34	$117	$159	$183	$206	$238	$253
	REVENUE ADJ . 1986	$2,900	$27	$92	$124	$143	$161	$186	$197
	PETRO. INDST. JOBS	*21,244*	*197*	*671*	*909*	*1,047*	*1,178*	*1,363*	*1,446*
	TOTAL JOBS	*74,542*	*692*	*2,356*	*3,190*	*3,674*	*4,135*	*4,781*	*5,075*
RESERVOIRS IN PERMIAN BASIN									
@$18.00/BBL	TOTAL REVENUE	$19,949	$128	$483	$648	$752	$870	$1,019	$1,067
	REVENUE ADJ . 1986	$15,585	$100	$377	$506	$588	$680	$796	$833
	PETRO. INDST. JOBS	*114,173*	*730*	*2,762*	*3,708*	*4,306*	*4,979*	*5,831*	*6,105*
	TOTAL JOBS	*400,615*	*2,561*	*9,692*	*13,012*	*15,110*	*17,472*	*20,462*	*21,423*
@$20.00/BBL	TOTAL REVENUE	$22,191	$143	$537	$721	$838	$971	$1,136	$1,189
	REVENUE ADJ . 1986	$17,337	$112	$419	$563	$655	$758	$887	$929
	PETRO. INDST. JOBS	*127,001*	*817*	*3,072*	*4,126*	*4,795*	*5,556*	*6,501*	*6,804*
	TOTAL JOBS	*445,628*	*2,867*	*10,778*	*14,477*	*16,825*	*19,496*	*22,812*	*23,874*
@$22.00/BBL	TOTAL REVENUE	$25,993	$196	$667	$903	$1,040	$1,171	$1,353	$1,437
	REVENUE ADJ . 1986	$20,307	$153	$521	$705	$812	$915	$1,057	$1,122
	PETRO. INDST. JOBS	*148,762*	*1,121*	*3,817*	*5,168*	*5,952*	*6,699*	*7,746*	*8,222*
	TOTAL JOBS	*521,982*	*3,935*	*13,393*	*18,134*	*20,884*	*23,507*	*27,179*	*28,851*

TABLE 5.1–Continued

(Million Dollars/year, Jobs/Year)

	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16
TOTAL REVENUE	$186	$176	$166	$159	$153	$141	$135	$143	$144
REVENUE ADJ. 1986	$145	$137	$130	$124	$120	$110	$106	$112	$113
PETRO. INDST. JOBS	*1,063*	*1,006*	*953*	*909*	*877*	*805*	*773*	*820*	*825*
TOTAL JOBS	*3,731*	*3,530*	*3,343*	*3,190*	*3,078*	*2,826*	*2,713*	*2,878*	*2,893*
TOTAL REVENUE	$207	$196	$185	$177	$170	$156	$150	$159	$160
REVENUE ADJ. 1986	$162	$153	$145	$138	$133	$122	$117	$124	$125
PETRO. INDST. JOBS	*1,185*	*1,121*	*1,060*	*1,010*	*975*	*895*	*859*	*911*	*916*
TOTAL JOBS	*4,156*	*3,933*	*3,721*	*3,544*	*3,420*	*3,140*	*3,014*	*3,198*	*3,215*
TOTAL REVENUE	$251	$233	$220	$209	$201	$185	$178	$185	$184
REVENUE ADJ. 1986	$196	$182	$172	$163	$157	$145	$139	$145	$144
PETRO. INDST. JOBS	*1,434*	*1,335*	*1,261*	*1,196*	*1,149*	*1,060*	*1,019*	*1,062*	*1,054*
TOTAL JOBS	*5,033*	*4,683*	*4,425*	*4,197*	*4,033*	*3,720*	*3,576*	*3,725*	*3,698*
TOTAL REVENUE	$1,056	$999	$946	$903	$871	$800	$768	$815	$819
REVENUE ADJ. 1986	$825	$781	$739	$705	$681	$625	$600	$636	$640
PETRO. INDST. JOBS	*6,044*	*5,719*	*5,416*	*5,168*	*4,987*	*4,579*	*4,395*	*4,663*	*4,688*
TOTAL JOBS	*21,207*	*20,068*	*19,004*	*18,134*	*17,497*	*16,065*	*15,422*	*16,360*	*16,448*
TOTAL REVENUE	$1,177	$1,113	$1,053	$1,003	$968	$889	$853	$905	$910
REVENUE ADJ. 1986	$919	$870	$823	$784	$756	$695	$667	$707	$711
PETRO. INDST. JOBS	*6,734*	*6,372*	*6,029*	*5,743*	*5,541*	*5,088*	*4,884*	*5,181*	*5,209*
TOTAL JOBS	*23,629*	*22,358*	*21,154*	*20,150*	*19,443*	*17,852*	*17,137*	*18,180*	*18,277*
TOTAL REVENUE	$1,425	$1,326	$1,253	$1,188	$1,142	$1,053	$1,012	$1,054	$1,047
REVENUE ADJ. 1986	$1,113	$1,036	$979	$928	$892	$823	$791	$824	$818
PETRO. INDST. JOBS	*8,153*	*7,587*	*7,170*	*6,800*	*6,533*	*6,027*	*5,794*	*6,034*	*5,991*
TOTAL JOBS	*28,609*	*26,621*	*25,157*	*23,859*	*22,924*	*21,147*	*20,329*	*21,174*	*21,022*

TABLE 5.1–Continued

(Million Dollars/year, Jobs/Year)

	YEAR 17	YEAR 18	YEAR 19	YEAR 20	YEAR 21	YEAR 22	YEAR 23	YEAR 24	YEAR 25
TOTAL REVENUE	$120	$120	$114	$99	$88	$77	$70	$61	$63
REVENUE ADJ. 1986	$93	$94	$89	$77	$69	$60	$55	$48	$49
PETRO. INDST. JOBS	*685*	*687*	*650*	*566*	*504*	*440*	*401*	*351*	*358*
TOTAL JOBS	*2,402*	*2,409*	*2,280*	*1,986*	*1,769*	*1,543*	*1,408*	*1,232*	*1,255*
TOTAL REVENUE	$133	$133	$126	$110	$98	$85	$78	$68	$69
REVENUE ADJ. 1986	$104	$104	$99	$86	$76	$67	$61	$53	$54
PETRO. INDST. JOBS	*761*	*763*	*722*	*629*	*560*	*489*	*446*	*390*	*398*
TOTAL JOBS	*2,669*	*2,676*	*2,534*	*2,206*	*1,965*	*1,715*	*1,565*	*1,368*	*1,395*
TOTAL REVENUE	$154	$154	$147	$127	$108	$94	$86	$75	$76
REVENUE ADJ. 1986	$120	$121	$115	$99	$84	$73	$67	$59	$60
PETRO. INDST. JOBS	*879*	*883*	*839*	*725*	*619*	*538*	*491*	*429*	*437*
TOTAL JOBS	*3,083*	*3,099*	*2,943*	*2,543*	*2,171*	*1,886*	*1,721*	*1,505*	*1,534*
TOTAL REVENUE	$680	$682	$645	$562	$501	$437	$399	$349	$355
REVENUE ADJ. 1986	$531	$533	$504	$439	$391	$341	$311	$272	$278
PETRO. INDST. JOBS	*3,892*	*3,903*	*3,694*	*3,217*	*2,866*	*2,501*	*2,281*	*1,995*	*2,034*
TOTAL JOBS	*13,656*	*13,693*	*12,963*	*11,287*	*10,055*	*8,774*	*8,005*	*7,001*	*7,136*
TOTAL REVENUE	$756	$758	$717	$625	$556	$486	$443	$387	$395
REVENUE ADJ. 1986	$590	$592	$560	$488	$435	$379	$346	$303	$309
PETRO. INDST. JOBS	*4,324*	*4,336*	*4,105*	*3,575*	*3,184*	*2,779*	*2,535*	*2,217*	*2,260*
TOTAL JOBS	*15,174*	*15,216*	*14,404*	*12,542*	*11,173*	*9,750*	*8,895*	*7,780*	*7,930*
TOTAL REVENUE	$873	$877	$833	$720	$615	$534	$487	$426	$434
REVENUE ADJ. 1986	$682	$685	$651	$562	$480	$417	$381	$333	$339
PETRO. INDST. JOBS	*4,994*	*5,021*	*4,769*	*4,121*	*3,518*	*3,056*	*2,788*	*2,439*	*2,486*
TOTAL JOBS	*17,523*	*17,619*	*16,732*	*14,458*	*12,342*	*10,724*	*9,784*	*8,557*	*8,722*

TABLE 5.1–Continued

(Million Dollars/year, Jobs/Year)

	YEAR 26	EAR 27	YEAR 28	EAR 29	EAR 30	EAR 31	YEAR 32	YEAR 33	YEAR34	YEAR 35	YEAR 36
TOTAL REVENUE	$62	$57	$49	$43	$39	$36	$33	$29	$27	$24	$23
REVENUE ADJ. 1986	$48	$45	$38	$34	$31	$28	$25	$23	$21	$19	$18
PETRO. INDST. JOBS	*353*	*326*	*280*	*246*	*226*	*208*	*186*	*166*	*152*	*140*	*129*
TOTAL JOBS	*1,238*	*1,144*	*981*	*863*	*793*	*728*	*654*	*581*	*535*	*492*	*453*
TOTAL REVENUE	$69	$63	$54	$48	$44	$40	$36	$32	$30	$27	$25
REVENUE ADJ. 1986	$54	$49	$42	$37	$34	$31	$28	$25	$23	$21	$20
PETRO. INDST. JOBS	*392*	*362*	*311*	*273*	*251*	*231*	*207*	*184*	*169*	*156*	*143*
TOTAL JOBS	*1,376*	*1,271*	*1,091*	*959*	*881*	*809*	*727*	*646*	*594*	*547*	*503*
TOTAL REVENUE	$75	$70	$60	$53	$48	$44	$40	$35	$33	$30	$28
REVENUE ADJ. 1986	$59	$54	$47	$41	$38	$35	$31	$28	$25	$23	$22
PETRO. INDST. JOBS	*431*	*398*	*342*	*301*	*276*	*254*	*228*	*202*	*186*	*171*	*158*
TOTAL JOBS	*1,514*	*1,398*	*1,200*	*1,054*	*969*	*890*	*800*	*710*	*654*	*601*	*553*
TOTAL REVENUE	$351	$351	$324	$278	$244	$224	$206	$185	$165	$151	$139
REVENUE ADJ. 1986	$274	$274	$253	$217	$191	$175	$161	$145	$129	$118	$109
PETRO. INDST. JOBS	*2,006*	*2,006*	*1,853*	*1,590*	*1,398*	*1,284*	*1,180*	*1,060*	*942*	*866*	*797*
TOTAL JOBS	*7,040*	*7,040*	*6,503*	*5,579*	*4,904*	*4,506*	*4,141*	*3,719*	*3,304*	*3,040*	*2,797*
TOTAL REVENUE	$390	$390	$360	$309	$271	$249	$229	$206	$183	$168	$155
REVENUE ADJ. 1986	$304	$304	$281	$241	$212	$195	$179	$161	$143	$131	$121
PETRO. INDST. JOBS	*2,229*	*2,229*	*2,059*	*1,767*	*1,553*	*1,427*	*1,311*	*1,178*	*1,046*	*963*	*886*
TOTAL JOBS	*7,823*	*7,823*	*7,226*	*6,200*	*5,450*	*5,007*	*4,601*	*4,132*	*3,672*	*3,378*	*3,108*
TOTAL REVENUE	$428	$428	$396	$340	$299	$274	$252	$226	$201	$185	$170
REVENUE ADJ. 1986	$335	$335	$309	$265	$233	$214	$197	$177	$157	$145	$133
PETRO. INDST. JOBS	*2,452*	*2,452*	*2,265*	*1,943*	*1,708*	*1,570*	*1,442*	*1,295*	*1,151*	*1,059*	*974*
TOTAL JOBS	*8,604*	*8,604*	*7,948*	*6,819*	*5,994*	*5,508*	*5,061*	*4,545*	*4,039*	*3,715*	*3,418*

TABLE 5.1–Continued

(Million Dollars/year, Jobs/Year)

	YEAR 26	EAR 27	YEAR 28	EAR 29	EAR 30	EAR 31	YEAR 32	YEAR 33	YEAR34	YEAR 35	YEAR 36
TOTAL REVENUE	$62	$57	$49	$43	$39	$36	$33	$29	$27	$24	$23
REVENUE ADJ. 1986	$48	$45	$38	$34	$31	$28	$25	$23	$21	$19	$18
PETRO. INDST. JOBS	*353*	*326*	*280*	*246*	*226*	*208*	*186*	*166*	*152*	*140*	*129*
TOTAL JOBS	*1,238*	*1,144*	*981*	*863*	*793*	*728*	*654*	*581*	*535*	*492*	*453*
TOTAL REVENUE	$69	$63	$54	$48	$44	$40	$36	$32	$30	$27	$25
REVENUE ADJ. 1986	$54	$49	$42	$37	$34	$31	$28	$25	$23	$21	$20
PETRO. INDST. JOBS	*392*	*362*	*311*	*273*	*251*	*231*	*207*	*184*	*169*	*156*	*143*
TOTAL JOBS	*1,376*	*1,271*	*1,091*	*959*	*881*	*809*	*727*	*646*	*594*	*547*	*503*
TOTAL REVENUE	$75	$70	$60	$53	$48	$44	$40	$35	$33	$30	$28
REVENUE ADJ. 1986	$59	$54	$47	$41	$38	$35	$31	$28	$25	$23	[illegible]
PETRO. INDST. JOBS	*431*	*398*	*342*	*301*	*276*	*254*	*228*	*202*	*186*	*171*	[illegible]
TOTAL JOBS	*1,514*	*1,398*	*1,200*	*1,054*	*969*	*890*	*800*	*710*	*654*	*601*	*553*
TOTAL REVENUE	$351	$351	$324	$278	$244	$224	$206	$185	$165	$151	$139
REVENUE ADJ. 1986	$274	$274	$253	$217	$191	$175	$161	$145	$129	$118	$109
PETRO. INDST. JOBS	*2,006*	*2,006*	*1,853*	*1,590*	*1,398*	*1,284*	*1,180*	*1,060*	*942*	*866*	*797*
TOTAL JOBS	*7,040*	*7,040*	*6,503*	*5,579*	*4,904*	*4,506*	*4,141*	*3,719*	*3,304*	*3,040*	*2,797*
TOTAL REVENUE	$390	$390	$360	$309	$271	$249	$229	$206	$183	$168	$155
REVENUE ADJ. 1986	$304	$304	$281	$241	$212	$195	$179	$161	$143	$131	$121
PETRO. INDST. JOBS	*2,229*	*2,229*	*2,059*	*1,767*	*1,553*	*1,427*	*1,311*	*1,178*	*1,046*	*963*	*886*
TOTAL JOBS	*7,823*	*7,823*	*7,226*	*6,200*	*5,450*	*5,007*	*4,601*	*4,132*	*3,672*	*3,378*	*3,108*
TOTAL REVENUE	$428	$428	$396	$340	$299	$274	$252	$226	$201	$185	$170
REVENUE ADJ. 1986	$335	$335	$309	$265	$233	$214	$197	$177	$157	$145	$133
PETRO. INDST. JOBS	*2,452*	*2,452*	*2,265*	*1,943*	*1,708*	*1,570*	*1,442*	*1,295*	*1,151*	*1,059*	*974*
TOTAL JOBS	*8,604*	*8,604*	*7,948*	*6,819*	*5,994*	*5,508*	*5,061*	*4,545*	*4,039*	*3,715*	*3,418*

TABLE 5.2–INCREMENTAL JOBS CREATED PER YEAR DUE TO SAN ANDRES PRODUCTION

IORC UNITS

(Jobs/Year, Million Dollars/year)

PRICE / BBL		TOT RCVY	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7
@$18.00/BBL	TOTAL REVENUE	$2,669	$22	$101	$163	$201	$244	$237	$213
	REVENUE ADJ. 1986	$2,085	$17	$79	$127	$157	$191	$185	$166
	PETRO. INDUST. JOBS	*15,274*	*124*	*578*	*933*	*1,152*	*1,398*	*1,355*	*1,216*
	TOTAL JOBS	*53,595*	*435*	*2,027*	*3,275*	*4,042*	*4,905*	*4,754*	*4,268*
@$20.00/BBL	TOTAL REVENUE	$3,449	$32	$145	$221	$266	$309	$297	$264
	REVENUE ADJ. 1986	$2,695	$25	$114	$173	$208	$242	$232	$206
	PETRO. INDUST. JOBS	*19,741*	*185*	*832*	*1,267*	*1,525*	*1,771*	*1,698*	*1,510*
	TOTAL JOBS	*69,269*	*649*	*2,920*	*4,445*	*5,351*	*6,213*	*5,958*	*5,299*
@$22.00/BBL	TOTAL REVENUE	$3,832	$36	$162	$248	$299	$346	$331	$294
	REVENUE ADJ. 1986	$2,994	$28	$127	$194	$233	$270	$259	$229
	PETRO. INDUST. JOBS	*21,932*	*207*	*930*	*1,420*	*1,710*	*1,978*	*1,894*	*1,681*
	TOTAL JOBS	*76,958*	*727*	*3,262*	*4,982*	*5,999*	*6,940*	*6,647*	*5,898*
RESERVOIRS IN PERMIAN BASIN									
@$18.00/BBL	TOTAL REVENUE	$52,851	$429	$1,999	$3,230	$3,986	$4,837	$4,688	$4,209
	REVENUE ADJ. 1986	$41,290	$335	$1,562	$2,523	$3,114	$3,779	$3,662	$3,288
	PETRO. INDUST. JOBS	*302,474*	*2,454*	*11,442*	*18,483*	*22,810*	*27,685*	*26,829*	*24,088*
	TOTAL JOBS	*1,061,333*	*8,611*	*40,148*	*64,855*	*80,036*	*97,143*	*94,140*	*84,522*
@$20.00/BBL	TOTAL REVENUE	$68,294	$640	$2,879	$4,382	$5,276	$6,126	$5,874	$5,224
	REVENUE ADJ. 1986	$53,354	$500	$2,249	$3,423	$4,122	$4,786	$4,589	$4,081
	PETRO. INDUST. JOBS	*390,853*	*3,663*	*16,478*	*25,079*	*30,193*	*35,058*	*33,618*	*29,899*
	TOTAL JOBS	*1,371,444*	*12,854*	*57,820*	*87,998*	*105,943*	*123,014*	*117,962*	*104,912*
@$22.00/BBL	TOTAL REVENUE	$75,790	$716	$3,213	$4,906	$5,908	$6,835	$6,546	$5,808
	REVENUE ADJ. 1986	$59,211	$559	$2,510	$3,833	$4,616	$5,340	$5,114	$4,538
	PETRO. INDUST. JOBS	*433,756*	*4,095*	*18,386*	*28,080*	*33,815*	*39,116*	*37,465*	*33,241*
	TOTAL JOBS	*1,521,982*	*14,369*	*64,513*	*98,527*	*118,650*	*137 253*	*131,460*	*116,638*

TABLE 5.2–Continued

(Jobs/Year, Million Dollars/year)

	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13	YEAR 14
TOTAL REVENUE	$178	$144	$120	$106	$89	$80	$68
REVENUE ADJ. 1986	$139	$113	$94	$83	$70	$63	$53
PETRO. INDUST. JOBS	*1,021*	*826*	*689*	*605*	*510*	*459*	*388*
TOTAL JOBS	*3,584*	*2,897*	*2,416*	*2,124*	*1,788*	*1,612*	*1,362*
TOTAL REVENUE	$222	$181	$153	$134	$112	$101	$86
REVENUE ADJ. 1986	$173	$141	$119	$105	$88	$79	$67
PETRO. INDUST. JOBS	*1,271*	*1,034*	*874*	*767*	*644*	*578*	*493*
TOTAL JOBS	*4,459*	*3,628*	*3,065*	*2,692*	*2,258*	*2,027*	*1,731*
TOTAL REVENUE	$247	$201	$170	$149	$125	$112	$95
REVENUE ADJ. 1986	$193	$157	$133	$117	$98	$88	$74
PETRO. INDUST. JOBS	*1,416*	*1,149*	*971*	*853*	*716*	*642*	*543*
TOTAL JOBS	*4,967*	*4,033*	*3,406*	*2,995*	*2,514*	*2,253*	*1,904*
TOTAL REVENUE	$3,534	$2,857	$2,383	$2,095	$1,763	$1,589	$1,343
REVENUE ADJ. 1986	$2,761	$2,232	$1,862	$1,637	$1,378	$1,242	$1,050
PETRO. INDUST. JOBS	*20,226*	*16,350*	*13,637*	*11,989*	*10,091*	*9,095*	*7,688*
TOTAL JOBS	*70,971*	*57,369*	*47,851*	*42,067*	*35,408*	*31,915*	*26,978*
TOTAL REVENUE	$4,396	$3,576	$3,022	$2,654	$2,226	$1,999	$1,707
REVENUE ADJ. 1986	$3,434	$2,794	$2,361	$2,074	$1,739	$1,561	$1,333
PETRO. INDUST. JOBS	*25,158*	*20,468*	*17,295*	*15,192*	*12,742*	*11,438*	*9,769*
TOTAL JOBS	*88,275*	*71,820*	*60,687*	*53,306*	*44,708*	*40,136*	*34,276*
TOTAL REVENUE	$4,892	$3,972	$3,354	$2,949	$2,476	$2,218	$1,875
REVENUE ADJ. 1986	$3,822	$3,103	$2,621	$2,304	$1,934	$1,733	$1,465
PETRO. INDUST. JOBS	*27,997*	*22,732*	*19,197*	*16,879*	*14,168*	*12,696*	*10,734*
TOTAL JOBS	*98,238*	*79,764*	*67,359*	*59,227*	*49,712*	*44,548*	*37,662*

TABLE 5.2–Continued

(Jobs/Year, Million Dollars/year)

	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	YEAR 21	YEAR 22	YEAR 23
TOTAL REVENUE	$61	$60	$55	$41	$33	$31	$27	$24	$25
REVENUE ADJ. 1986	$48	$47	$43	$32	$26	$24	$21	$19	$19
PETRO. INDUST. JOBS	*348*	*344*	*316*	*237*	*192*	*175*	*157*	*139*	*142*
TOTAL JOBS	*1,223*	*1,207*	*1,110*	*831*	*673*	*615*	*550*	*488*	*498*
TOTAL REVENUE	$77	$76	$70	$54	$44	$41	$36	$33	$33
REVENUE ADJ. 1986	$60	$59	$54	$42	$35	$32	$28	$25	$26
PETRO. INDUST. JOBS	*443*	*434*	*398*	*306*	*253*	*232*	*209*	*187*	*188*
TOTAL JOBS	*1,555*	*1,521*	*1,398*	*1,075*	*888*	*814*	*732*	*655*	*658*
TOTAL REVENUE	$85	$83	$77	$59	$49	$45	$40	$36	$36
REVENUE ADJ. 1986	$67	$65	$60	$46	$38	$35	$31	$28	$28
PETRO. INDUST. JOBS	*488*	*477*	*438*	*337*	*278*	*255*	*229*	*205*	*206*
TOTAL JOBS	*1,711*	*1,673*	*1,538*	*1,183*	*977*	*895*	*805*	*721*	*724*
TOTAL REVENUE	$1,206	$1,190	$1,094	$819	$663	$606	$542	$482	$491
REVENUE ADJ. 1986	$942	$930	$855	$640	$518	$474	$424	$376	$383
PETRO. INDUST. JOBS	*6,900*	*6,812*	*6,262*	*4,688*	*3,797*	*3,470*	*3,102*	*2,756*	*2,808*
TOTAL JOBS	*24,212*	*23,902*	*21,972*	*16,451*	*13,321*	*12,177*	*10,886*	*9,671*	*9,852*
TOTAL REVENUE	$1,533	$1,500	$1,378	$1,060	$876	$802	$722	$646	$649
REVENUE ADJ. 1986	$1,198	$1,172	$1,077	$828	$684	$627	$564	$505	$507
PETRO. INDUST. JOBS	*8,775*	*8,584*	*7,889*	*6,068*	*5,011*	*4,591*	*4,130*	*3,698*	*3,713*
TOTAL JOBS	*30,789*	*30,120*	*27,681*	*21,290*	*17,584*	*16,108*	*14,490*	*12,975*	*13,028*
TOTAL REVENUE	$1,685	$1,648	$1,515	$1,165	$962	$881	$793	$710	$713
REVENUE ADJ. 1986	$1,316	$1,288	$1,183	$910	$752	$689	$619	$555	$557
PETRO. INDUST. JOBS	*9,642*	*9,432*	*8,668*	*6,667*	*5,506*	*5,044*	*4,538*	*4,063*	*4,080*
TOTAL JOBS	*33,831*	*33,096*	*30,415*	*23,393*	*19,321*	*17,699*	*15,922*	*14,257*	*14,314*

TABLE 5.2–Continued

(Jobs/Year, Million Dollars/year)

	YEAR 24	YEAR 25	YEAR 26	YEAR 27	YEAR 28	YEAR 29	YEAR 30	YEAR 31
TOTAL REVENUE	$30	$28	$26	$24	$23	$22	$14	$13
REVENUE ADJ. 1986	$23	$22	$20	$19	$18	$17	$11	$10
PETRO. INDUST. JOBS	*171*	*160*	*149*	*140*	*132*	*124*	*80*	*74*
TOTAL JOBS	*600*	*560*	*524*	*492*	*463*	*436*	*281*	*259*
TOTAL REVENUE	$38	$36	$33	$31	$29	$28	$19	$18
REVENUE ADJ. 1986	$30	$28	$26	$24	$23	$22	$15	$14
PETRO. INDUST. JOBS	*218*	*204*	*191*	*179*	*168*	*159*	*109*	*101*
TOTAL JOBS	*766*	*715*	*669*	*628*	*591*	*557*	*381*	*353*
TOTAL REVENUE	$42	$39	$37	$34	$32	$31	$21	$19
REVENUE ADJ. 1986	$33	$31	$29	$27	$25	$24	$16	$15
PETRO. INDUST. JOBS	*240*	*224*	*210*	*197*	*185*	*175*	*119*	*111*
TOTAL JOBS	*842*	*786*	*736*	*691*	*650*	*613*	*419*	*388*
TOTAL REVENUE	$592	$552	$517	$485	$456	$430	$277	$256
REVENUE ADJ. 1986	$463	$432	$404	$379	$356	$336	$217	$200
PETRO. INDUST. JOBS	*3,389*	*3,162*	*2,959*	*2,776*	*2,611*	*2,461*	*1,587*	*1,464*
TOTAL JOBS	*11,891*	*11,095*	*10,381*	*9,740*	*9,161*	*8,635*	*5,569*	*5,137*
TOTAL REVENUE	$755	$705	$660	$619	$582	$549	$376	$348
REVENUE ADJ. 1986	$590	$550	$515	$484	$455	$429	$293	$272
PETRO. INDUST. JOBS	*4,320*	*4,033*	*3,775*	*3,543*	*3,333*	*3,142*	*2,149*	*1,992*
TOTAL JOBS	*15,157*	*14,150*	*13,246*	*12,432*	*11,695*	*11,026*	*7,541*	*6,989*
TOTAL REVENUE	$829	$774	$725	$680	$640	$603	$413	$382
REVENUE ADJ. 1986	$648	$605	$566	$531	$500	$471	$322	$299
PETRO. INDUST. JOBS	*4,746*	*4,431*	*4,148*	*3,893*	*3,662*	*3,453*	*2,361*	*2,188*
TOTAL JOBS	*16,654*	*15,548*	*14,555*	*13,660*	*12,850*	*12,115*	*8,286*	*7,679*

TABLE 5.2–Continued

(Jobs/Year, Million Dollars/year)

	YEAR 32	YEAR 33	YEAR34	YEAR 35	YEAR 36	YEAR 37	YEAR 38	YEAR 39
TOTAL REVENUE	$10	$8	$8	$7	$7	$11	$12	$12
REVENUE ADJ. 1986	$7	$7	$6	$6	$6	$9	$10	$9
PETRO. INDUST. JOBS	*54*	*48*	*43*	*42*	*41*	*62*	*71*	*69*
TOTAL JOBS	*191*	*169*	*153*	*149*	*145*	*219*	*251*	*243*
TOTAL REVENUE	$14	$13	$11	$12	$13	$17	$19	$18
REVENUE ADJ. 1986	$11	$10	$9	$10	$10	$13	$15	$14
PETRO. INDUST. JOBS	*78*	*72*	*64*	*70*	*76*	*98*	*107*	*103*
TOTAL JOBS	*273*	*252*	*225*	*246*	*266*	*344*	*375*	*363*
TOTAL REVENUE	$15	$14	$12	$13	$15	$19	$21	$20
REVENUE ADJ. 1986	$12	$11	$10	$11	$11	$15	$16	$16
PETRO. INDUST. JOBS	*86*	*79*	*70*	*77*	*83*	*108*	*118*	*114*
TOTAL JOBS	*301*	*277*	*247*	*271*	*293*	*379*	*413*	*399*
TOTAL REVENUE	$188	$166	$150	$147	$143	$216	$247	$239
REVENUE ADJ. 1986	$147	$130	$118	$114	$112	$169	$193	$187
PETRO. INDUST. JOBS	*1,077*	*952*	*861*	*839*	*817*	*1,236*	*1,414*	*1,370*
TOTAL JOBS	*3,780*	*3,340*	*3,021*	*2,943*	*2,868*	*4,336*	*4,961*	*4,807*
TOTAL REVENUE	$270	$249	$222	$243	$262	$339	$370	$357
REVENUE ADJ. 1986	$211	$194	$173	$190	$205	$265	$289	$279
PETRO. INDUST. JOBS	*1,543*	*1,423*	*1,269*	*1,389*	*1,502*	*1,942*	*2,117*	*2,046*
TOTAL JOBS	*5,414*	*4,992*	*4,452*	*4,874*	*5,271*	*6,815*	*7,427*	*7,179*
TOTAL REVENUE	$296	$273	$244	$267	$288	$373	$406	$393
REVENUE ADJ. 1986	$231	$213	$190	$208	$225	$291	$317	$307
PETRO. INDUST. JOBS	*1,695*	*1,563*	*1,394*	*1,526*	*1,651*	*2,134*	*2,326*	*2,248*
TOTAL JOBS	*5,949*	*5,486*	*4,891*	*5,356*	*5,792*	*7,488*	*8,161*	*7,888*

TABLE 5.2–Continued

(Jobs/Year, Million Dollars/year)

	YEAR 40	YEAR 41	YEAR 42	YEAR43	YEAR 44	YEAR 45	YEAR 46	YEAR 47	YEAR 48
TOTAL REVENUE	$12	$11	$11	$11	$10	$10	$10	[illegible]	$4
REVENUE ADJ. 1986	$9	$9	$9	$8	$8	$8	$8		$3
PETRO. INDUST. JOBS	*67*	*65*	*63*	*61*	*59*	*58*	*56*	[illegible]	*22*
TOTAL JOBS	*235*	*228*	*221*	*215*	*209*	*203*	*197*	*192*	*78*
TOTAL REVENUE	$17	$17	$16	$14	$12	$11	$11	$11	$4
REVENUE ADJ. 1986	$14	$13	$13	$11	$9	$9	$9	$8	$3
PETRO. INDUST. JOBS	*100*	*97*	*94*	*79*	*66*	*64*	*62*	*61*	*25*
TOTAL JOBS	*351*	*339*	*329*	*279*	*232*	*225*	*219*	*213*	*87*
TOTAL REVENUE	$19	$19	$18	$15	$[illegible]	$12	$12	$12	$5
REVENUE ADJ. 1986	$15	$15	$14	$12	$13	$10	$9	$9	$4
PETRO. INDUST. JOBS	*110*	*106*	*103*	*87*	*73*	*71*	*69*	*67*	*27*
TOTAL JOBS	*386*	*373*	*361*	*307*	*255*	*248*	*241*	*234*	*96*
TOTAL REVENUE	$232	$225	$218	$212	$206	$200	$194	$189	$77
REVENUE ADJ. 1986	$181	$176	$171	$166	$161	$156	$152	$148	$60
PETRO. INDUST. JOBS	*1,328*	*1,288*	*1,250*	*1,213*	*1,178*	*1,144*	*1,112*	*1,081*	*442*
TOTAL JOBS	*4,660*	*4,520*	*4,385*	*4,256*	*4,133*	*4,015*	*3,902*	*3,793*	*1,549*
TOTAL REVENUE	$3,457	$335	$324	$275	$229	$222	$216	$210	$86
REVENUE ADJ. 1986	$2,701	$261	$253	$215	$179	$174	$169	$164	$67
PETRO. INDUST. JOBS	*19,787*	*1,915*	*1,854*	*1,574*	*1,308*	*1,271*	*1,235*	*1,201*	*491*
TOTAL JOBS	*69,429*	*6,718*	*6,504*	*5,522*	*4,591*	*4,460*	*4,334*	*4,213*	*1,721*
TOTAL REVENUE	$380	$368	$356	$302	$251	$244	$237	$231	$94
REVENUE ADJ. 1986	$297	$287	$278	$236	$196	$191	$185	$180	$74
PETRO. INDUST. JOBS	*2,174*	*2,104*	*2,037*	*1,729*	*1,438*	*1,397*	*1,357*	*1,319*	*539*
TOTAL JOBS	*7,629*	*7,382*	*7,147*	*6,067*	*5,045*	*4,901*	*4,762*	*4,630*	*1,891*

TABLE 5.3–EARNINGS OF U.S. ENGINEERS PER YEAR, 1989

TYPE OF ENGINEER	STARTING SALARY
PETROLEUM	$35,202
CHEMICAL	$35,122
METALLURGICAL	$32,235
MECHANICAL	$32,064
ELECTRICAL	$31,788
NUCLEAR	$31,750
INDUSTRIAL	$30,535
AEROSPACE	$30,509
MINING	$29,383
CIVIL	$28,136

CHAPTER VI

INFILL DRILLING OIL PRODUCTION GENERATES TAX REVENUE

6.1 General Description

The oil industry is normally taxed by three different government agencies: the county, state and federal governments. The county tax is called advalorem tax; the state government tax is called severance tax; and the federal government tax is called corporate income tax. The aforementioned taxes are computed from the infill drilling recovery revenue calculated using an oil price ranging from $18.00/bbl to $22.00/bbl. Only the oil production is used for advalorem and severance tax computations. For the purpose of this study, gas production is not used in these computations. However, oil and gas production is used to compute the federal corporate income tax.

6.2 Advalorem Tax Revenue

The first tax revenue computed is the advalorem tax. Caution must be used in computing this tax because every county has their own way of computing the tax. The counties in the Permian Basin follow this axiom as well. This tax is based on the present worth of the oil and gas property. The county normally has an independent agency to calculate the present worth of each property being taxed. The present worth changes with the price of oil and the amount of recoverable oil left in the reservoir.

The average advalorem tax for the State of Texas is 4.0% of the oil and gas produced.[38] As shown in Fig. on p.95, multiply the IORC unit's infill drilling oil recovery revenue computed at $18.00/bbl by a tax rate of 4.0% for a total advalorem tax revenue of $247 million for the 48 year life of the project. The average tax revenue is $5.2 million per year from the IORC units.

Fig. on p.96 shows the advalorem tax revenue computed for the entire Clearfork and San Andres reservoirs in the Permian Basin. The yearly average is $61 million per year divided by 50 counties in the Permian Basin and equals $1.2 million per county. Fig. on p.97 and p.98 show an oil and gas revenue for Midland and Ector Counties of $1.4 million and $2.5 million, respectively for 1992.[31-32] If the arrow shown in Fig. on p.96 is assumed to be 1995, the Permian Basin counties should be collecting $1.2 million per year from the infill drilling of the San Andres and Clearfork reservoirs. This estimate seems a bit too high thus illustrating the fact that using the 4% advalorem tax rate is a very rough estimate. The amount of taxes from oil and gas property for Ector County is an approximate because the Ector County tax collector does not have a separate line item for property taxes and mineral property taxes. The assumption is made that Midland and Ector Counties have the same percentage of mineral property tax to the overall property tax. The oil and gas tax is approximated from Midland County property taxes by multiplying the Ector County property tax by 25% which is the percent of Midland County mineral property tax to the overall property tax for Midland County. Table on p.103 shows the results. Table on p.103 also shows the oil property taxes deducted from Midland and Ector Counties. Either all taxes are raised 10% or all services would have to be reduced by 10%. The tax revenue and expenditure categories and how they are affected are shown in Table on p.103.

6.3 Severance Tax Revenue

The next tax revenue computed is the severance tax. For the State of Texas, the average severance tax is 4.6% of the oil and 7.5% of the gas produced.[38] This tax is computed directly from the well head price. Only oil revenue is used in this computation. As shown in Fig. on p.99, multiply the IORC unit's infill drilling oil recovery revenue computed at $18.00/bbl by a tax rate of 4.6% for a total severance tax revenue of $284 million for the 48 year

life of the project. The average tax revenue is $5.9 million per year from the IORC units.

Fig. on p.100 shows the severance tax revenue computed for the entire Clearfork and San Andres reservoirs in the Permian Basin. The yearly average is $70 million per year. Fig. on p.101 show an oil and gas revenue for the State of Texas of $1 Billion for 1992.[33] If the arrow shown in Fig. on p.100 is assumed to be 1995, the state should collect $70 million or 7% annually from the infill drilling of the San Andres and Clearfork reservoirs. Also, looking at 1995, for every $1.00 change in the oil price, the severance tax revenue changes approximately $6.5 million just from infill drilling in the Clearfork and San Andres reservoirs. Table on p.103 shows the results if the State of Texas did not have oil property taxes to collect. Either all taxes are raised 3.5% or all services would have to be reduced by 3.5%. The categories and how they are affected are shown in Table on p.103.

6.4 Federal Income Tax Revenue

The amount of federal income tax paid by the IORC units is directly read from Tables on p.40 and p.42 in Chapter IV. Table on p.107 shows for example that at $18.00/bbl, the IORC Clearfork Units paid $153 million for the 48-year life of the projects. If the income tax is divided by the total production of the IORC Clearfork units, 194 million barrels, a value of 0.79 cents/bbl is computed. Now the total amount of oil produced by infill drilling from the Clearfork formation is 1,108 million barrels and multiplied by 0.79 cents/bbl is $876 million for the life of the 48 year project. Adding this value to the projected infill drilling recovery from the San Andres reservoirs, the total amount is $7,041.6 million for the life of the project or $146.7 million per year. Fig. on p.102 shows that $146.7 million is only 0.17% of the $87 billion of the corporate income tax collected in 1992. This is a humbling fact because one can see how much effort it takes to generate 0.17% of the federal revenue every year. As a reminder, this study covers

the incremental infill drilling recovery of 75% of the OOIP of the largest oil region in the United States.[34]

6.5 Expenditures of the Department of Energy Tax Revenues

The oil industry could receive back some of the corporate income tax it pays through the programs available from the Department of Energy (DOE). The budget of the DOE in 1992 was $15.5 billion. Most of this money is spent on Energy projects.[34] On energy supply, energy conservation and emergency energy preparedness the DOE spent $4.789, $0.511, and $0.282 billion respectively. For energy information, policy, and regulation, the DOE spent $0.513 billion for a total of $6.095 billion. The DOE gave the State of Texas $35 million for research in the energy industry. Most of the money went to Universities.[34] The Department of Commerce, Economic Development Agency[34] is always looking for projects to invest federal tax dollars to increase jobs. But up to the present date, no oil companies have submitted proposals to the subject office. See Fig. 6.1 through 6.8 and Tables 6.1 and 6.2 as follows.

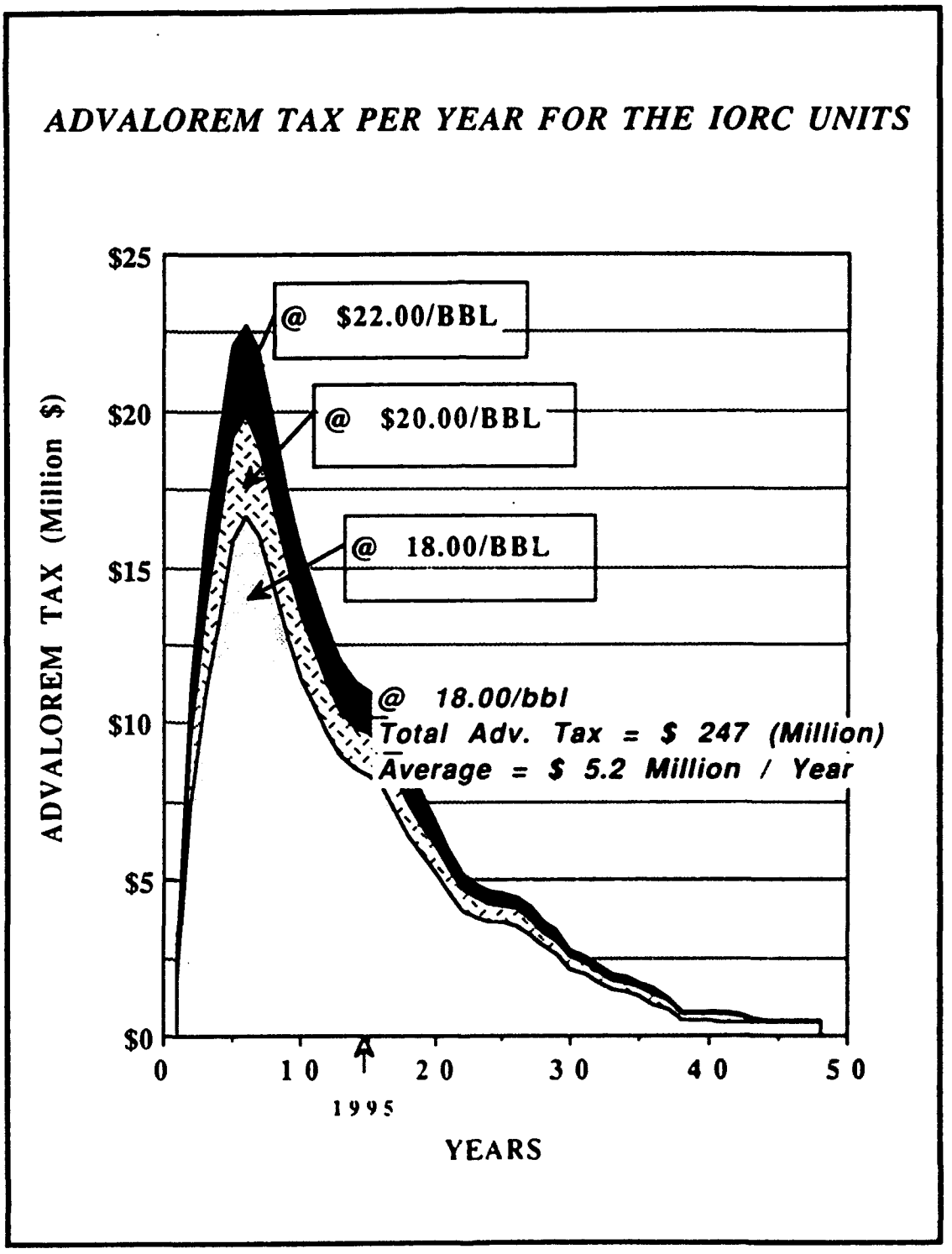

Fig. 6.1—Advalorem tax per year for the IORC units.

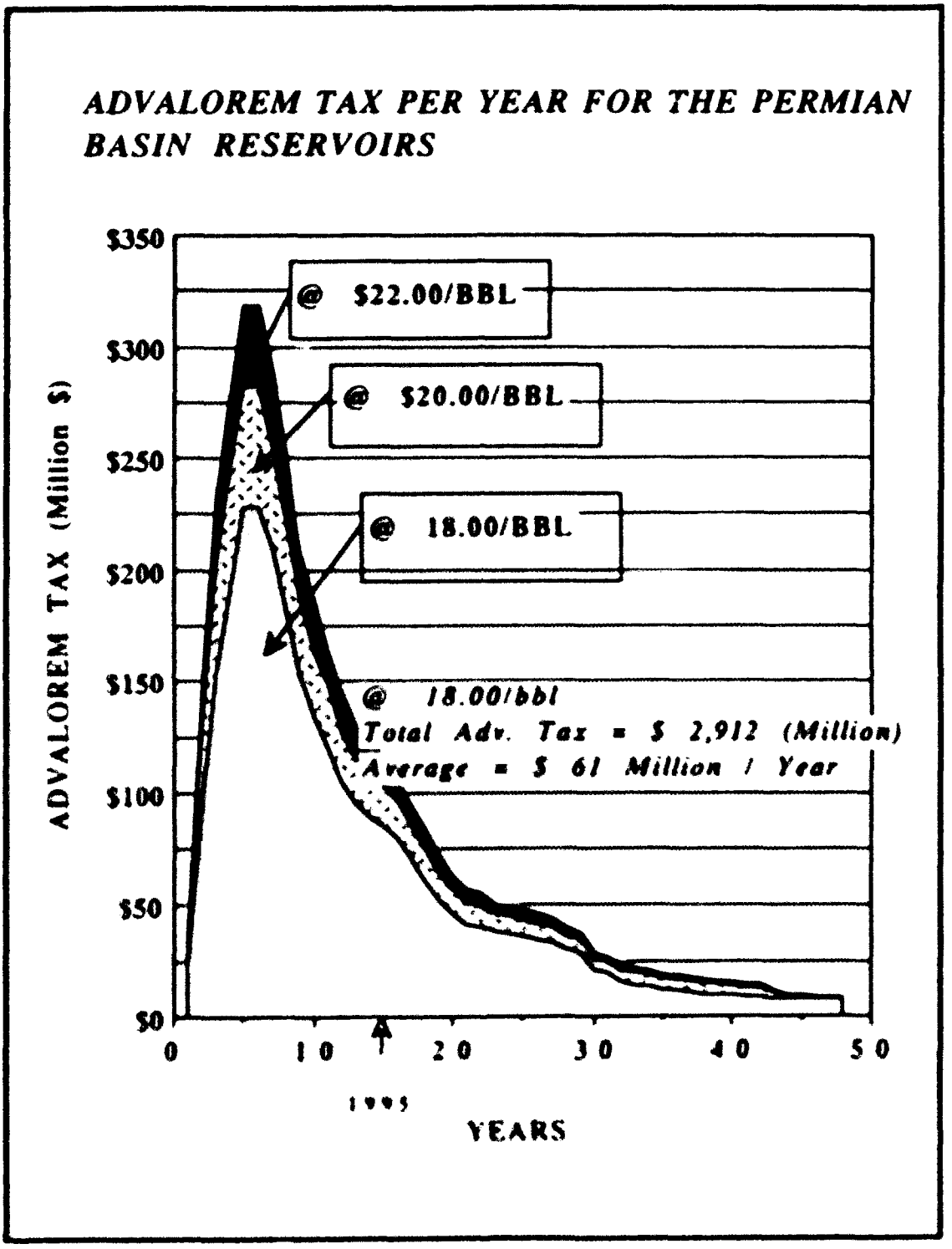

Fig. 6.2—Advalorem tax per year for the Permian Basin reservoirs.

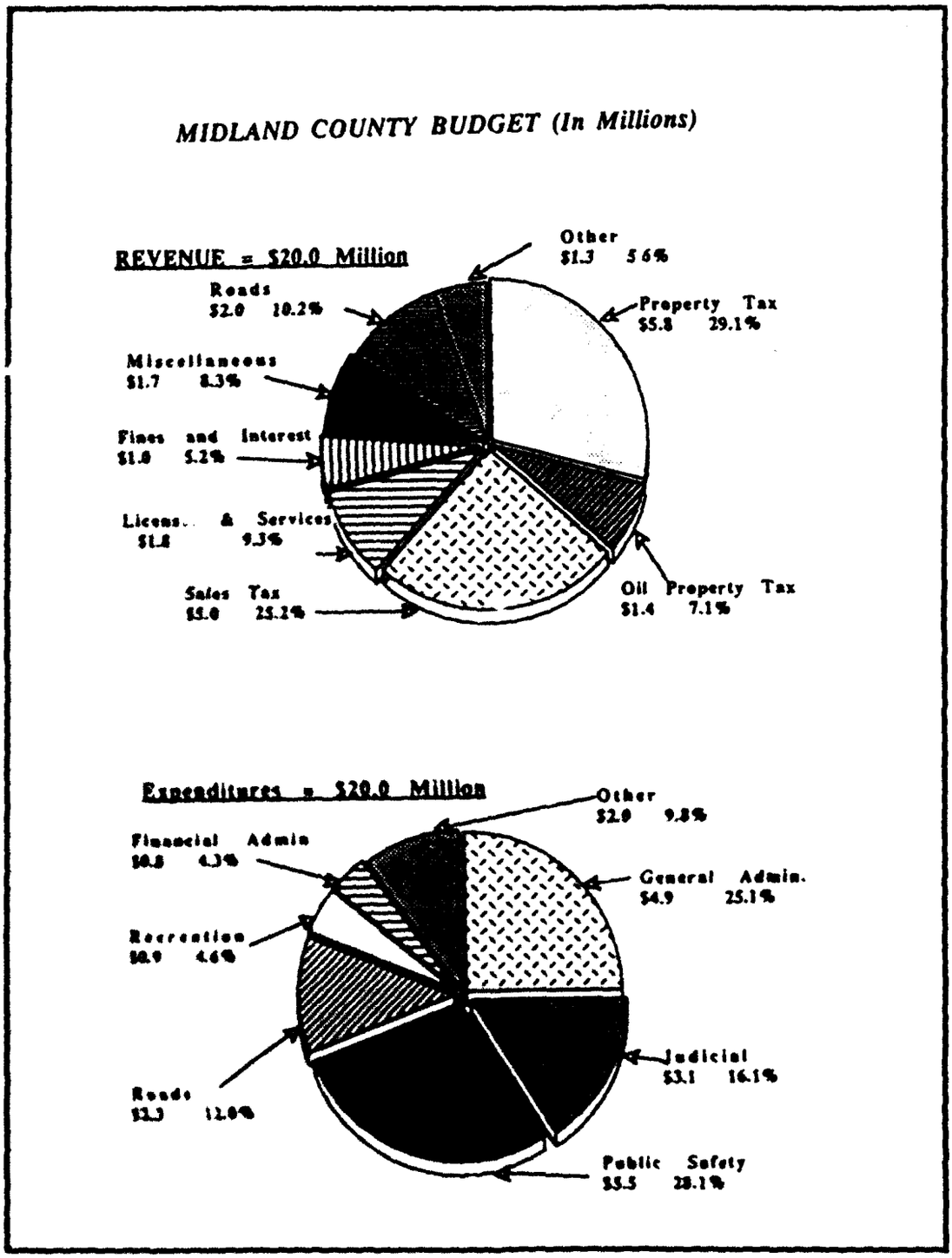

Fig. 6.3—Midland County 1992 budget.

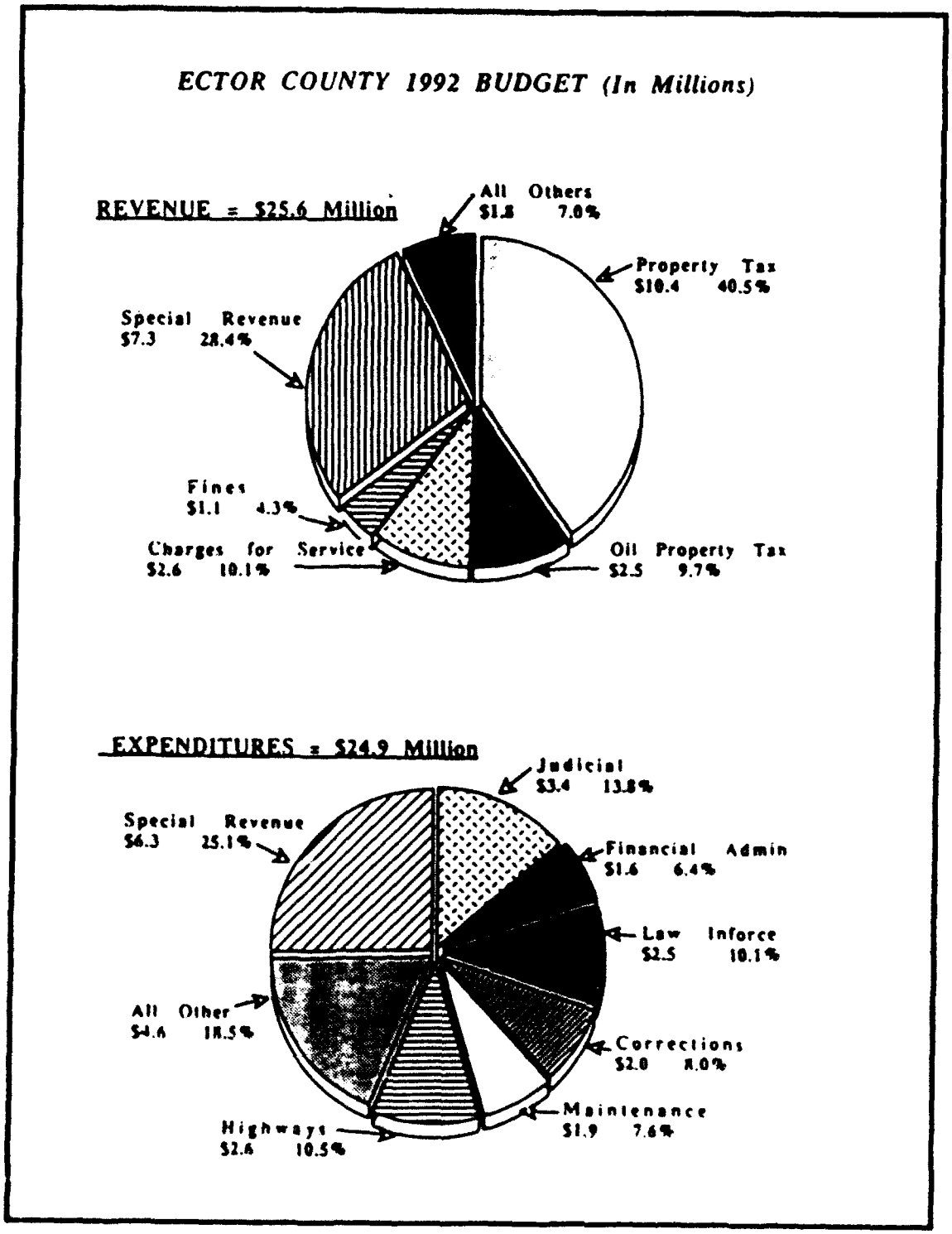

Fig. 6.4—Ector County 1992 budget.

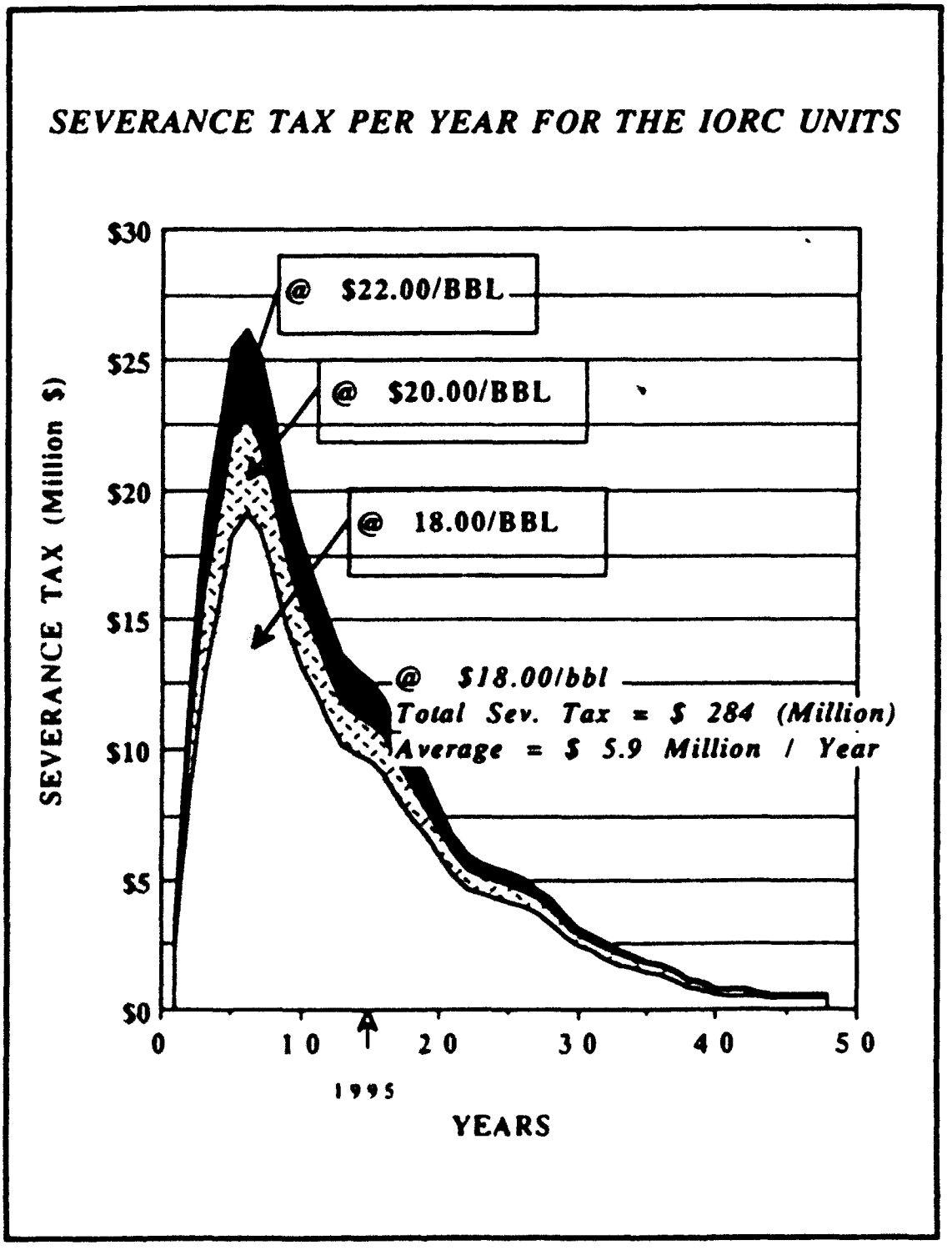

Fig. 6.5—Severance tax per year for the IORC units.

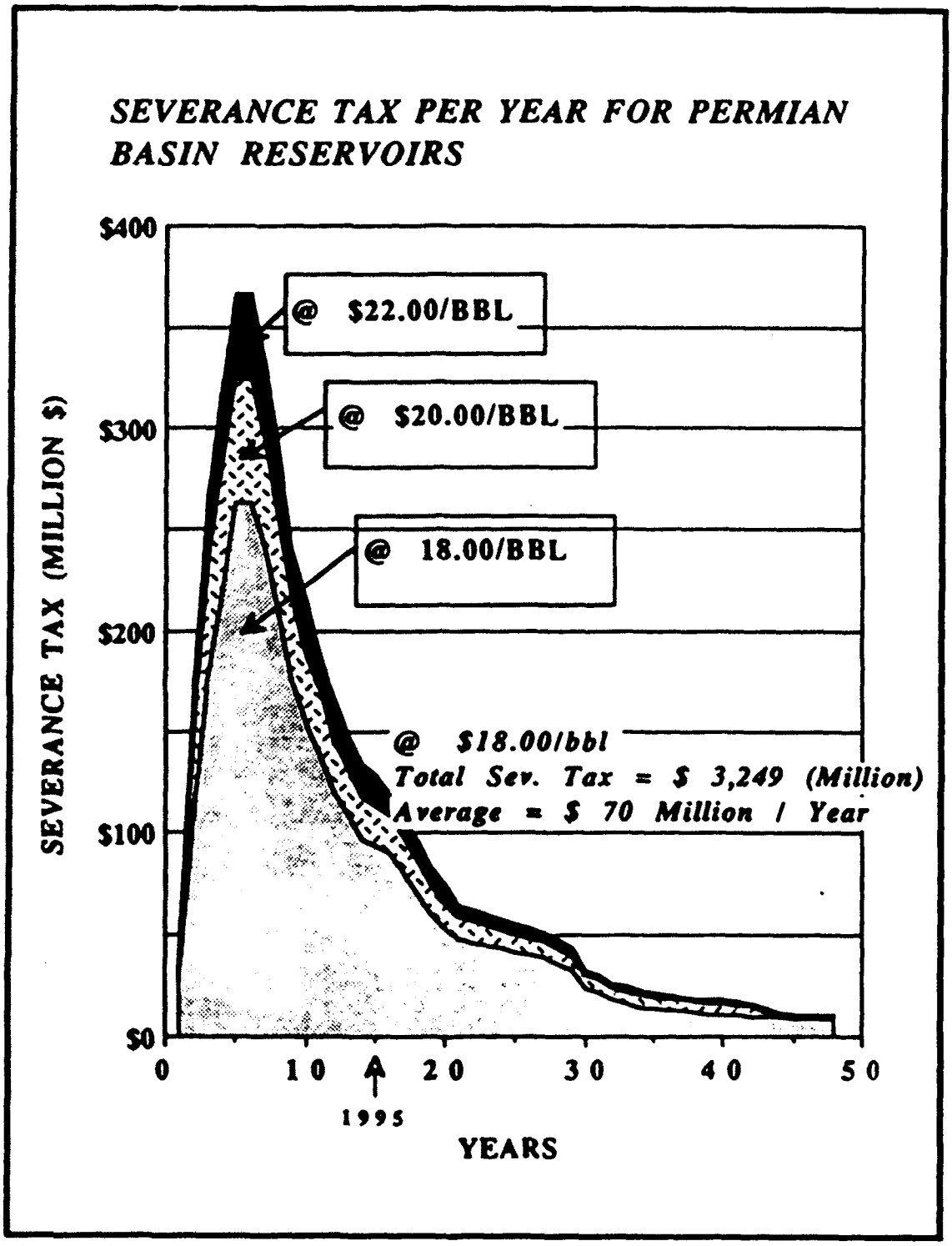

Fig. 6.6–Severance tax per year for the Permian Basin reservoirs.

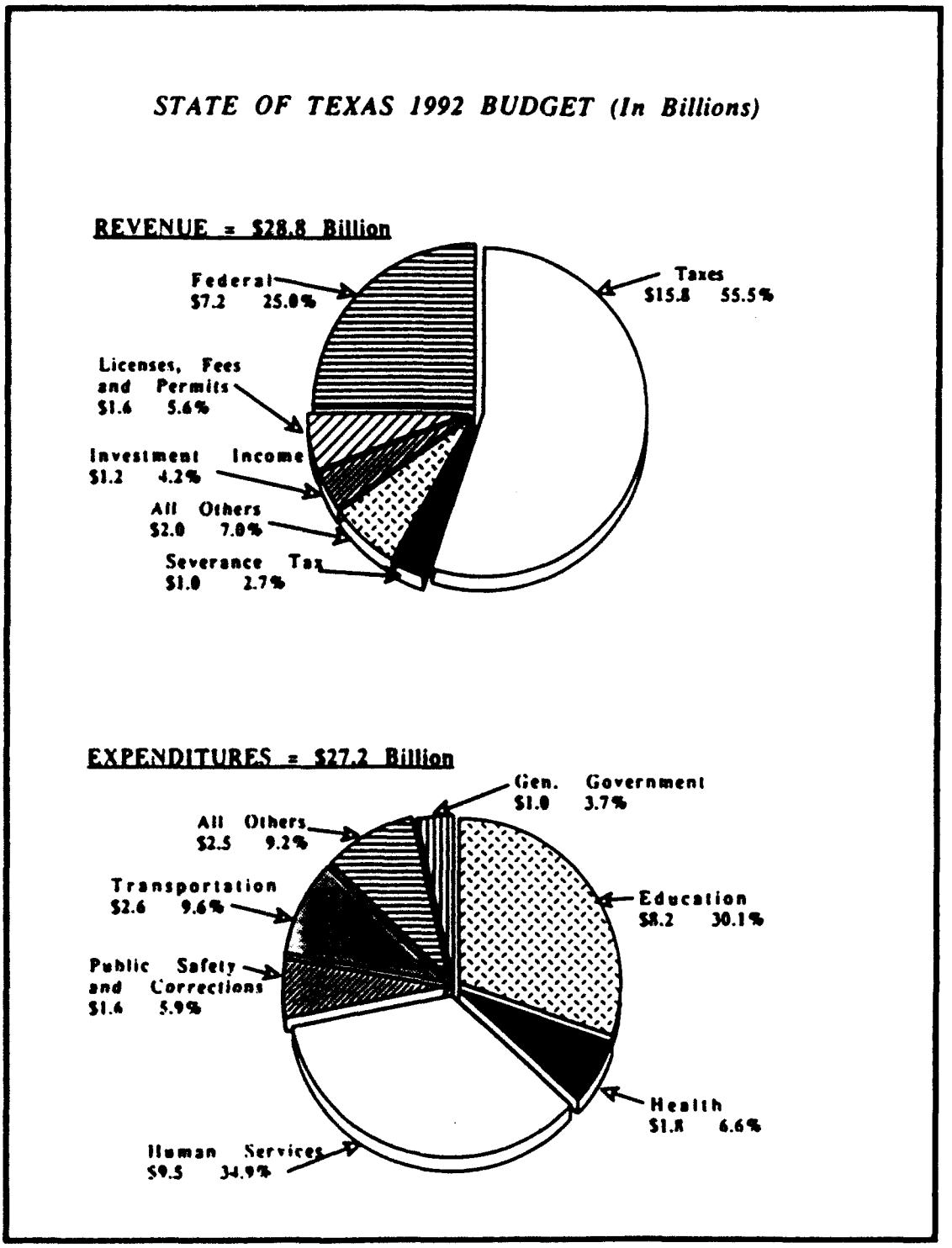

Fig. 6.7—State of Texas 1992 budget.

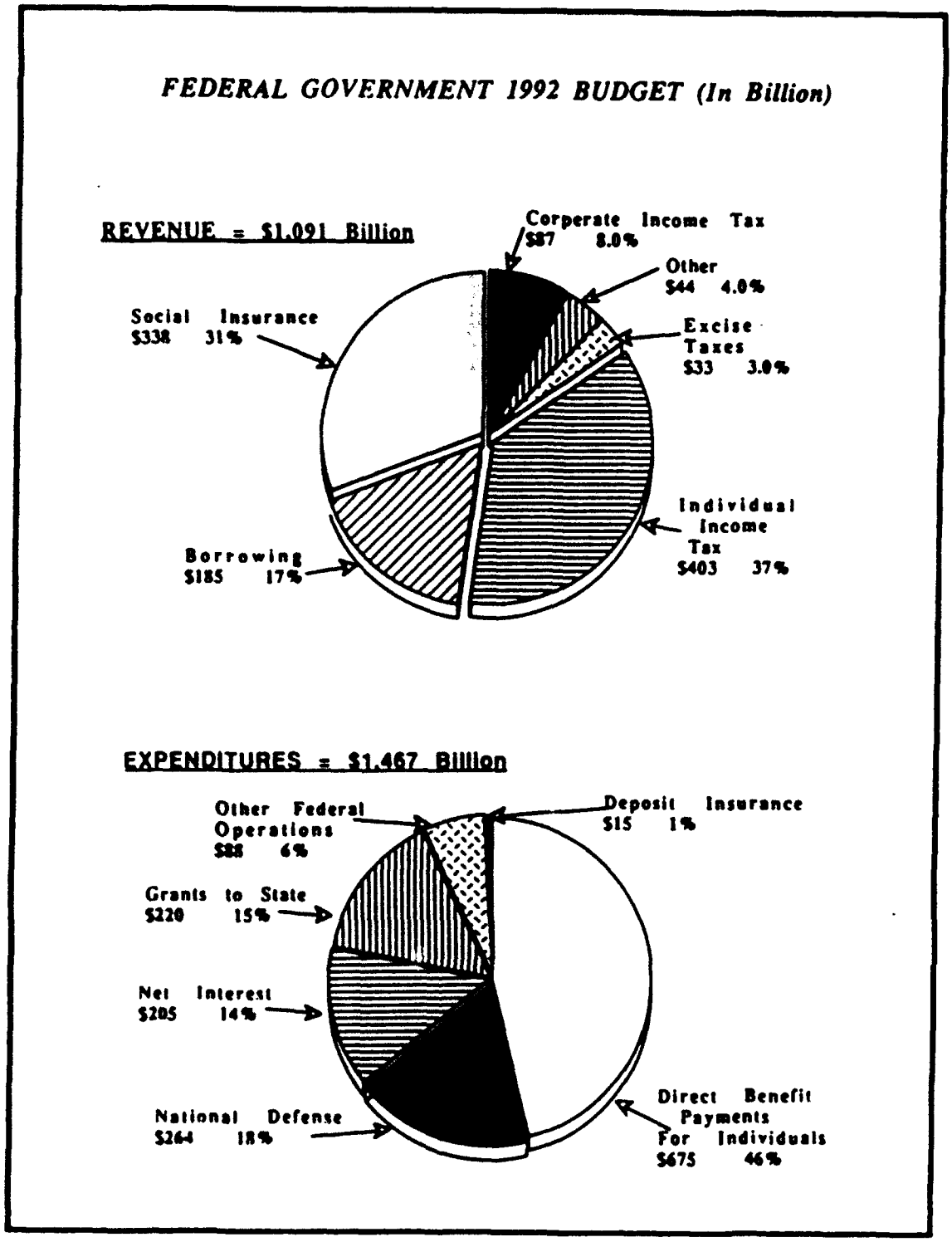

Fig. 6.8—Federal Government 1992 budget.

TABLE 6.1–TAX REVENUE AND EXPENDITURES

Ector County, Texas (1992 Budget)

	(WITH OIL REVENUE)		(WITHOUT OIL REV.)	
REVENUES	**FUNDS ($)**	**% FUNDS**	**FUNDS ($)**	**% FUNDS**
PROPERTY TAX, PENT. & INT.	$10,354,867	40.4%	$11,379,999	44.4%
FROM OIL FIELD PROPERTY	$2,531,886	9.9%	$0	0.00%
LICENSES AND PERMITS	$71,370	0.3%	$78,436	0.3%
CHARGES FOR CUR. SERV.	$2,624,456	10.2%	$2,884,277	11.3%
FINES AND FORFEITURES	$1,070,256	4.2%	$1,176,211	4.6%
INTERGOVERNMENTAL CHRGS	$0	0.0%	$0	0.0%
INTEREST	$412,400	1.6%	$453,228	1.8%
OTHER REVENUE	$83,717	0.3%	$92,005	0.4%
SPECIAL REVENUE FUNDS	$7,266,034	28.4%	$7,985,371	31.2%
DEBT SERVICE FUNDS	$962,275	3.8%	$1,057,540	4.1%
CAPITAL PROJECTS FUNDS	$242,794	0.9%	$266,831	1.0%
				0.0%
				0.0%
TOTAL REVENUES	*25,620,055*	*100.0%*	*25,620,055*	*100.0%*
EXPENDITURES				
CURRENT				
ADMINISTRATIVE	$436,651	1.8%	$392,244	1.6%
JUDICIAL	$3,419,842	13.7%	$3,072,044	12.3%
FINANCIAL ADMIN.	$1,588,719	6.4%	$1,427,146	5.7%
LAW ENFORCEMENT	$2,449,194	9.8%	$2,200,111	8.8%
CORRECTION	$2,062,491	8.3%	$1,852,736	7.4%
HEALTH AND WELFARE	$729,781	2.9%	$655,562	2.6%
FIRE PROTECTION	$71,500	0.3%	$64,228	0.3%
CULTURAL - RECREATION	$261,999	1.1%	$235,354	0.9%
LIBRARY	$633,086	2.5%	$568,701	2.3%
MAINTENANCE	$1,878,241	7.5%	$1,687,224	6.8%
CONSERV. OF NAT. RES.	$73,738	0.3%	$66,239	0.3%
HIGHWAYS & STREETS	$2,622,277	10.5%	$2,355,591	9.5%
NONDEPART. AND OTHER	$1,820,276	7.3%	$1,635,154	6.6%
CAPITAL OUTLAY	$529,919	2.1%	$476,026	1.9%
SPECIAL REVENUE FUNDS	$6,320,107	25.4%	$5,677,352	22.8%
TOTAL EXPENDITURES	*24,897,821*	*100.0%*	*22,365,713*	*89.8%*

TABLE 6.1–Continued

Midland County, Texas (1992 Budget)

REVENUE	(WITH OIL REVENUE) FUNDS ($)	% FUNDS	(WITHOUT OIL REV.) FUNDS ($)	% FUNDS
PROPERTY TAXES	$5,823,497	29.1%	$6,238,388	31.2%
OIL TAXES	$1,423,913	7.1%	$0	0.0%
SALES TAXES	$5,045,608	25.2%	$5,405,079	27.0%
LICENSES	$190,945	1.0%	$204,549	1.0%
CHARGES FOR SERVICES	$1,652,577	8.3%	$1,770,314	8.9%
INTEREST	$195,029	1.0%	$208,924	1.0%
FINES AND FORFEITURES	$843,022	4.2%	$903,083	4.5%
INTERGOVERNMENTAL	$0	0.0%	$0	0.0%
MISCELLANEOUS	$1,651,360	8.3%	$1,769,010	8.9%
ROAD AND BRIDGE	$2,030,320	10.2%	$2,174,969	10.9%
LAW LIBRARY	$47,871	0.2%	$51,282	0.3%
OTHER FINANCING SOURCES	$309,320	1.5%	$331,357	1.7%
DEBT SERVICE	$772,871	3.9%	$827,934	4.1%
TOTAL REVENUE	*$19,986,333*	*100.0%*	*19,986,333*	*100.0%*
EXPENDITURES				
CURRENT				
GENERAL ADMINISTRATION	$4,903,870	25.1%	$4,546,839	23.2%
JUDICIAL	$3,139,365	16.1%	$2,910,800	14.9%
FINANCIAL ADMIN.	$835,363	4.3%	$774,544	4.0%
ELECTIONS	$138,119	0.7%	$128,063	0.7%
PUBLIC SAFETY AND CORR.	$5,499,785	28.1%	$5,099,368	26.1%
HEALTH AND WELFARE	$62,976	0.3%	$58,391	0.3%
CULTURE AND RECREATION	$890,498	4.6%	$825,664	4.2%
CONSERVATION & NATL RES.	$124,081	0.6%	$115,047	0.6%
CAPITAL OUTLAY	$609,832	3.1%	$565,433	2.9%
DEBT SERVICE	$964,763	4.9%	$894,522	4.6%
ROAD AND BRIDGE	$2,342,922	12.0%	$2,172,343	11.1%
LAW LIBRARY	$45,963	0.2%	$42,617	0.2%
TOTAL EXPENDITURES	*$19,557,537*	*100.0%*	*18,133,631*	*92.7%*

TABLE 6.1–Continued

State of Texas (1992 Budget in $ Millions)

REVENUE	(WITH OIL REVENUE) FUNDS ($)	% FUNDS	(WITHOUT OIL REV.) FUNDS ($)	% FUNDS
TAXES	$15,785	54.8%	$16,357	56.7%
OIL TAXES	$1,000	3.5 %	$0	0.0%
FEDERAL	$7,224	25.1%	$7,486	26.0%
LICENSE, FEES AND PERMITS	$1,594	5.5%	$1,651	5.7%
INTEREST AND INVEST. INC.	$1,209	4.2%	$1,253	4.3%
LAND INCOME	$14	0.0%	$14	0.0%
SALES OF GOODS AND SEVICES	$354	1.2%	$367	1.3%
OTHER INCOME	$1,648	5.7%	$1,707	5.9%
TOTAL REVENUE	*$28,827*	*100.0%*	*$28,827*	100.0%
GENERAL GOVERNMENT	$986	3.6%	$951	3.5%
EDUCATION	$8,177	29.9%	$7,891	28.9%
EMPLOYEE BENEFITS	$609	2.2%	$587	2.2%
HEALTH	$1,854	6.8%	$1,789	6.6%
HUMAN SERVICES	$9,592	35.1%	$9,256	33.9%
PUBLIC SAFETY AND COR.	$1,631	6.0%	$1,574	5.8%
TRANSPORTATION	$2,567	9.4%	$2,477	9.1%
NATURAL RESOURCES AND REC. SERVICES	$489	0.0% 1.8%	$0 $472	0.0% 1.7%
REGULATORY AGENIES	$215	0.8%	$207	0.8%
DEBT SERVICE	$657	2.4%	$634	2.3%
CAPITAL OUTLAY	$531	1.9%	$512	1.9%
TOTAL EXPENDITURES	*$27,306*	*100.0%*	*$26,350*	*96.5%*

TABLE 6.1–Continued

Federal Government (1992 Budget in Billions)

	FUNDS ($)	% FUNDS
INDIVIDUAL INCOME TAXES	$403	37.0 %
SOCIAL INSURANCE RECEIPTS	$338	31.0 %
BORROWING	$185	17.0 %
CORPORATE INCOME TAX	$87	8.0 %
OTHER	$44	4.0 %
EXCISE TAXES	$33	3.0 %
TOTAL REVENUE	*$1,091*	*100.0 %*
DIRECT BENEFIT PAYMENTS FOR INDIVIDUALS	$675	46.0 %
NATIONAL DEFENSE	$264	18.0 %
NET INTEREST	$205	14.0 %
GRANTS TO STATE AND LOCALITIES	$220	15.0 %
OTHER FEDERAL OPERATIONS	$88	6.0 %
DEPOSIT INSURANCE	$15	1.0 %
TOTAL EXPENDITURES	*$1,467*	*100.0 %*

TABLE 6.2–FEDERAL INCOME TAX CALCULATIONS

FORMATION	TAX PAID (Million)	TOTL OIL PROD (Barrels)	TAX/BBL ($/bbl)
IORC CLEARFORK UNITS			
@18.00/BBL	$153,230	194,963,993	0.79
@20.00/BBL	$193,660	195,168,402	0.99
@22.00/BBL	$233,246	207,841,040	1.12
IORC SAN ANDRES UNITS			
@18.00/BBL	$311,447	148,268,998	2.10
@20.00/BBL	$361,687	172,469,742	2.10
@22.00/BBL	$412,789	174,193,191	2.37
PERMIAN BASIN CLEARFORK RESERVOIRS			
@18.00/BBL	$875,600	1,108,299,000	0.79
@20.00/BBL	$1,098,000	1,109,544,000	0.99
@22.00/BBL	$1,323,000	1,181,505,000	1.12
PERMIAN BASIN SAN ANDRES RESERVOIRS			
@18.00/BBL	6,166,000	2,936,173,500	2.10
@20.00/BBL	7,171,000	3,414,684,000	2.10
@22.00/BBL	8,165,000	3,445,000,000	2.37

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

The methodology presented in this thesis is in a format in which any one can acquire the tools needed to calculate revenue, jobs and taxes from infill drilling in the San Andres and Clearfork reservoirs in the Permian Basin.

7.1.1 Revenue From Oil Reserves

The incremental oil and gas production from infill drilling is economical for investors in the majority of infill drilling projects if the price of oil averages above $18.00/bbl. The correlation between oil prices and infill drilling recovery in the two subject formations has been established in this study. When the oil prices increase, more oil is economically recoverable. Also, the total revenues increase with each rise in the price of oil per barrel due to higher oil recovery and higher oil sales price. In 1994, for every $1.00 change in the average price of oil, the infill drilling incremental oil production changes approximately 3 million barrels of oil a year or 8,400 bbl/day roughly 0.4% of the total oil production from Texas. The State of Texas produces 1.9 million barrels of oil per day. Also, the rule of thumb to compute revenue applies to the oil companies in that every dollar introduced in the community which is earned in the community will generates 3 additional dollars for the same community.

7.1.2 Jobs From Oil Revenue

The results of this thesis shows that crude oil and natural gas generate 7.3256 oil industry jobs per million dollars[29]

produced at the well head, 13.8684 oil industry plus general industry jobs per million dollars[29] produced at the well head and 25.7044 oil industry plus general industry plus secondary jobs per million dollars[29] produced at the well head. The production of oil and gas includes the gross value of the product and excludes contracted drilling services. This compares to the econometrics model by Southwest Econometrics in Austin, Texas whose results are 13 oil industry jobs plus general industry jobs per million dollars produced at the well head. Another comparison is made by Mr. Dwane Phillips of Union Pacific Resources who stated that they create 6 oil industry jobs and 20 secondary jobs per every million dollars they spend in Brazos County.[40]

The revenue from the infill drilling projects creates jobs and increases the prosperity in the Permian Basin communities. The average number of jobs created by the Permian Basin reservoirs per year is 30,500 for 48 years. In 1994, at $18.00/bbl, every $1.00 change in the oil price means a change of 1,200 jobs. The total number of job-years that could be created by the Permian Basin reservoirs is 1,462,000 job-years. These job figures are compared to the total number of industrial jobs in the State of Texas which is 7,152,000 jobs per year. The oil industry employs 4.0% of Texas workers which is the third largest employer next to real estate at 4.4% and maintenance and repair at 4.1%.[29] Another example is the automobile manufacturing industry (sector 80) which accounts for 13,824 jobs in Texas and the petroleum industry (sector 11 through 15) accounts for 289,304 jobs. Almost 21 times more jobs than in the auto industry.[29] One rule of thumb method for computing jobs in the oil industry is 106 jobs per drilling rig.

7.1.3 Tax Revenue From Oil Reserves

The increase in county tax revenue from these projects creates jobs and stimulates the local economy. The advalorem tax revenue computed for the entire Clearfork and San Andres

reservoirs in the Permian Basin per year averages $61 million per year which equals $1.2 million per county. Furthermore, if the oil property taxes from Midland and Ector Counties are deducted from their budgets, either all taxes are raised 10% or all services would be reduced by 10%.

The increase in state tax revenue from these projects will create jobs and stimulate the State of Texas economy. The state should collect $70 million or 7% annually from the infill drilling of the San Andres and Clearfork reservoirs. In addition, in 1994, for every $1.00 change in the oil price, the severance tax revenue changes approximately 6.5 million just from infill drilling in the Clearfork and San Andres formations. If the State of Texas did not have oil property taxes to collect, either all taxes are raised 3.5% or all services would be reduced by 3.5%.

The increase in federal tax revenue from the infill drilling projects will create jobs and stimulate the United States economy and strengthen our position worldwide. The Permian Basin Clearfork and San Andres formations contribute an average of $146.7 million or 0.17% of the $87 billion of the corporate income tax collected in 1992 to the federal government.

7.2 Recommendations and Commentary

7.2.1 Enacted Legislation

To stimulate the oil production in the Permian Basin, the local, state and federal governments could enact legislation which would improve the oil recovery economics. The United States Congress has passed legislation to stimulate the oil industry in 1989. The Enhanced Oil and Gas Recovery Tax Act of 1989 (S.828)[25] is designed to provide incentives to U.S. oil producers to increase recovery of the large volume of immobile (residual) oil remaining in domestic reservoirs through the use of enhanced oil recovery (EOR). S.828 effectively addresses and encourages techniques that would foster residual oil recovery. However,

there remains in existing reservoirs such as the Clearfork and San Andres formation an additional recoverable resource that is not addressed in S.828. This resource is the remaining movable oil (exclusive of reserves) that is contained in reservoirs of such complexity that improved recovery is limited due to economic uncertainties. The nation's 100 billion barrels (Bbbls) of unrecovered mobile oil is a resource of enormous potential.[25]

The passing of Bill S.828 will increase oil production in the Permian Basin and help to reduce the value of imports thus translating into net impact on the balance of trade. The positive impact on that trade balance, which today is approximately -$130 billion per year could, in the extreme, amount to an improvement of $3.0 Billion per year(in 1985 dollars) by the year 2000. Whether the net impact of the bill amounts to a positive impact on the balance of trade depends to some extent on the ultimate impact on the federal budget and whether such an investment stimulus makes the U.S. more or less competitive in world markets.[25]

Furthermore, the passing of Bill S.828 helps in the redistribution of economic activity among the regions of the U.S. such as the Permian Basin area in West Texas. The stimulus to economic growth in the oil-producing states certainly will not amount to a net redistribution of economic activity without an impact on economic growth for the U.S. That is, stimulus to growth in the under-employed regions of the country, e.g. West Texas, will most likely result in an aggregate increase in U. S. economic activity.[25]

Finally, the most important positive economic impact of S.828 is the United States reduced dependency upon imported oil especially at the time of a future crisis such as a foreign oil shortage.[25]

7.2.2 Future of Petroleum Industry

The crude oil production in the Permian Basin continues to

oil needs in the face of the lowest level of domestic production in 35 years.[21] The United States imported an average of almost 8.5 million barrels of crude oil and refined products per day, a record 49.5 percent of its total supply. The previous record was 47.7 percent in 1977. Imports increased 7.8 percent primarily because domestic production fell by 4.3 percent or 300,000 barrels per day. Demand rose by only 0.4 percent for 1993. Domestic production, about 6.9 million barrels per day, was at its lowest level since 1958 and 25 percent below the level of 1973, the year of the Arab oil crisis.[21]

The trend is likely to continue because of low crude oil prices and federal policies that hinder permanent development of the most likely new sources of domestic production such as infill drilling. Rising dependence on imported oil increases the chances that the U. S., including the West Texas economy, will suffer from another interruption of supplies by foreign producers with their own political goals.[21]

Although domestic oil production, including West Texas, has been declining steadily for eight years, the Independent Petroleum Association of America, in December 1993, asked the Clinton administration to take emergency action now to stem the rising tide of imports. The independents argued that the dip in oil prices last fall will accelerate the decline by forcing producers to shut in many marginal wells. The administration is considering the petition, but it is not expected to impose an oil import fee or take any other action. However, current drilling activity is not expected to offset losses in production.[21]

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APPENDIX A

DESCRIPTION OF PROPOSED S. 828 (THE ENHANCED OIL AND GAS RECOVERY TAX ACT OF 1989)

Modifications to S. 828 as evaluated in this include a 10-percent Investment Tax Credit and broadening of the incentives package to include Advance Secondary Recovery

DESCRIPTION OF S. 828

(ENHANCED OIL AND GAS RECOVERY TAX ACT OF 1989)

Scheduled for a Hearing

Before the

SUBCOMMITTEE ON ENERGY AND AGRICULTURAL TAXATION

of the

SENATE COMMITTEE ON FINANCE

on August 3, 1989

Prepared by the Staff

of the

JOINT COMMITTEE ON TAXATION

August 1, 1989

JCX-40-89

CONTENTS

INTRODUCTION

The Subcommittee on Energy and Agricultural Taxation of the Senate Committee on Finance has scheduled a public hearing on August 3, 1989, in S. 828, the "Enhanced Oil and Gas Recovery Tax Act of 1989" (introduced in April 18, 1989, by Senators Domenici, Boren, Dole, Nickles, Wallop, Garn, Bingaman, Johnston, McClure, and Gramm). The bill would provide tax incentives for the removal of crude oil and gas through enhanced recovery techniques and a tax credit for research and development to discover or improve tertiary recovery methods.

This document[1],.prepared by the staff of the Joint Committee on taxation, provides a description of S. 828. The first part of the document is a summary. The second part is a description of the bill, including present law, effective dates, and related provisions of the Administration proposal for tax incentives for enhanced oil and gas recovery.

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[1] This document may be cited as follows: Joint Committee on Taxation, Description of S. 828 (Enhanced Oil and Gas Recovery Tax Act of 1989) (JCX-40-89), August 1, 1989.

I. SUMMARY

S. 828--Enhanced Oil and Gas Recovery Tax Act of 1989

Senators Domenici, Boren, Dole, Nickles, Wallop, Garn, Bingaman, Johnston, Mcclure, and Gramm

The bill would increase the percentage depletion rate for domestic oil and gas recovered through enhanced recovery techniques to 27.5 percent, phase-down as the price of crude oil increases above $30 per barrel adjusted for inflation. The bill would also increase the net income limitation on this oil and gas from 50 percent 100 percent. The alternative minimum tax preferences for percentage depletion and intangible drilling costs (IDC)s would not apply to the deductions attribtable to this oil and gas. Further, a 10 percent research and development tax credit would apply to research to discover or improve tertiary recovery methods.

Administration Proposal[2]

The Administration proposal would replace the 50 percent net income limitation with a limitation based on 100 percent of new income in the case of all percentage depletion to be claimed by a transferee of proven oil or gas producing property. Further, the proposal would eliminate 80 percent of independent producers for exploratory drilling. The proposal would also provide a 10 percent tax credit for certain projects utilizing tertiary enhanced recovery techniques.

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[2] As contained in President Bush's budget proposal for fiscal year 1990, submitted to the Congress on February 9, 1989.

II. DESCRIPTION OF S. 828

A. Enhanced Oil and Gas Recovery Depletion Allowance

Present Law

General rules

Certain costs incurred prior to drilling an oil or gas producing property are recovered through depletion deductions. Generally, these include costs of acquiring the lease or other interest in the property, and geological and geophysical costs. Depletion is available to any person having an economic interest in a producing property (including a royalty interest, working interest, overriding royalty interest, or net profits interest).

Depletion is computed using whichever of two methods results in a higher deduction: cost depletion or percentage depletion (however, the deduction for percentage depletion is limited to certain taxpayers as discussed below).

Under the cost depletion method, the taxpayer deducts that portion of the adjusted basis of the property which is equal to the ratio of units sold from that property during the taxable year to the estimated number of units remaining to be recovered at the beginning of the taxable year. The amount recovered under cost depletion cannot exceed the taxpayer's basis in the property.

Under the percentage depletion method, 15 percent of the taxpayer's gross income from an oil or gas producing property is allowed as a deduction in each taxable year. The amount deducted cannot exceed 50 percent of the taxable income from the property for the taxable year, computed without regard to depletion deduction (the "net income limitation"). Additionally, the allowance for percentage depletion cannot exceed 65 percent of the taxpayer's overall taxable income, determined before such deduction and adjusted for certain loss, carrybacks and trust

distributions (the "taxable income limitation")[3]. Because percentage depletion is computed without regard to the taxpayer's basis in a property, cumulative depletion deductions may exceed the amount expended by the taxpayer to acquire or develop the property.

LIMITATION OF DEDUCTION FOR PERCENTATE DEPLETION TO INDEPENDENT PRODUCERS, ETC.

Under present law, the deduction for percentage depletion for oil and gas properties is limited to independent producers and royalty owners (as opposed to integrated oil companies), for up to 1,000 barrels of average daily domestic crude oil production, or an equivalent amount of domestic natural gas. For producers of both crude oil and natural gas, this limitation applies on a combined basis[4].

For purposes of percentage depletion, an independent producer is any producer who is not a "retailer" or "refiner." A retailer is any person who directly, or through a related person, sells oil or natural gas (or any product derived therefrom) (1) though any retail outlet operated by the taxpayer or a related person, or (2) to any person obligated to market or distribute such oil or natural gas (or product derived therefrom) under the name of the taxpayer or the related person. Bulk sales to commercial or industrial users, and bulk sales of aviation fuel to he Department of Defense, are excluded for this purpose. Furthermore, a person is not a retailer within the meaning of this provision if the combined gross receipts of that person and

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3 An amount disallowed as a result of this rule can be carried forward as a percentage depletion deduction in the following taxable year, subject to the 65 percent taxable income limitation for that year.

4 Certain regulated natural gas, natural gas sold under a fixed contract, and natural gas from geopressed brine is exempt from the 1000-barrel-per-day limitation.

all related persons from the retail sale of oil and natural gas (or any product derived therefrom), do not exceed $5 million for a taxable year.

A refiner is any person who directly, or through a related person, engages in the refining of crude oil, but only if such taxpayer and related person have refinery runs in excess of 50,000 barrels on any day during the taxable year.

Percentage depletion is not allowed with respect to the transferee of a transferred proven oil or gas producing property. Generally, a proven property is a property that, at the time of transfer, has had its principal value demonstrated by prospecting, exploration, or discovery work.

Explanation of the Bill

Depletion rate for enhanced recovery

S. 828 would provide a 27.5 percent depletion rate with respect to the production of domestic incremental tertiary crude oil and natural gas during the enhanced recovery period. This deduction would be available to all taxpayers (including independent and integrated producers) for an unlimited amount of production. Under the bill, the 27.5 percent rate would be phased-down to 15 percent by one percentage point for every dollar that the taxpayer's average removal price of oil for the calendar year exceeds $30 per barrel[5]. Under the bill, a taxpayer's average annual removal price for any calender year would be computed by dividing the aggregate dollar amount for domestic crude oil was sold by the taxpayer during the calendr year, by the taxpayer's aggregate production of such oil[6].

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5 The $30 per barrel threshold will be adjusted annually for inflation, as measured by the GNP implicit price deflator, beginning in 1991

6. As drafted, the bill contains a technical error in the definition of the term "average annual removal price," by defining such term as the aggregate production of crude oil, divided by the aggregate receipts from the sale of such oil.

For purposes of the bill, incremental tertiary oil and gas includes incremental tertiary oil as defined for prior law windfall profit tax purposes (Code sec. 4993(a), using the current Energy Department (DOE) regulations). Under DOE regulations, tertiary recovery techniques include miscible fluid displacement, steam driven injection, microemulsion or micellar emulsion flooding, in situ combustion, polymer augmented water flooding, cyclic steam injection, alkaline or caustic flooding, carbon dioxide augmented water flooding, and immiscible carbon dioxide displacement. Reservoir improvements (including infill patterns and pattern conformance) incident to a qualified tertiary recovery project would be treated as a project which is otherwise a qualified tertiary project. Oil and gas produced from nonhydrocarbon gas flooding, tight formation gas, and certain tight formation oil would also qualify as incremental tertiary oil and gas under the bill.

The enhanced recovery period is a period, as determined by a schedule to be published by the Secretary of the Treasury, based on the average period for a project to recover the expenses of the type of project involved for that geographic region. The enhanced recovery period would not end earlier than six months after the publication of the schedule by the Secretary.

The bill would not amend present law treatment applicable to the deduction for percentage depletion by independent producers and royalty owners for property other than enhanced tertiary recovery property. Additionally, the bill generally would not treat barrels of enhanced domestic tertiary oil and gas produced by an independent producer or royalty owner as barrels of oil or gas produced by such person in applying the 1,000 barrel per day limitation on such deduction.

Net income limitation

In addition, the bill would increase the net income limitation from 50 percent to 100 percent of net income in the case of

depletable property which produces domestic incremental tertiary crude oil or natural gas during the enhanced recovery period.

Effective date

The provision would be effective for oil and gas production after the date of enactment and before January 1, 2010. The provision would apply after December 21. 1999, only to production form a project begun before January 1, 2000. Expansion of a project begun on or after the date of enactment would be treated as a separate project. In the case of production from a project begun on or before the date of enactment, the rate for percentage depletion would be 18 percent rather than 27.5 percent.

B. Alternative Minimum Tax

Present Law

Depletion

Under present law, the deduction for depletion is an item of tax perference for purposes of the individual and corporate alternative minimum taxes, to the extent that the depletion deduction constitutes excess percentage depletion. Excess percentage depletion is defined as the excess of taxpayer's allowable depletion deduction for the taxable year with respect to a particular oil or gas producing property over its adjusted basis in such property at the end of the year (prior to adjusting the basis for current year allowable depletion)[7].

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7. Additionally for this purpose, the adjusted basis does not include intangible drilling costs attributable to the property that have been previously deducted by the taxpayer.

Intangible drilling and development costs

Under present law, the deduction for intangible drilling and development costs (IDCs) on a successful oil and gas wells is an item of tax preference for purposes of the individual and corporate alternative minimum taxes, to the extent that the taxpayer's excess IDCs exceed 65 percent of its net income from oil and gas properties. (Geothermal properties are treated in a similar manner). Excess IDC's are defined generally as (1) IDC deductions (attributable to successful wells) for the taxable year, minus (2) the amount that would have been deductible in that year had the IDCs been capitalized and recovered over a 10-year amortization schedule in determining the amount of tax preference[8].

IDCs are not treated as an item of tax preference if the taxpayer elects to amortize such costs over a 10-year period.

Explanation of the bill

Depletion and IDCs as tax preference items

S. 828 would repeal the treatment of excess depletion and excess IDCs as items of tax preference with respect to domestic properties that produce oil and gas through the use of enhanced tertiary recovery techniques if the average annual removal price of oil for the taxable year is less than $30 per barrel (adjusted for inflation beginning in 1991)[9].

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8. In addition, for taxable years beginning after December 31, 1989, corporations are subject to an alternative minimum tax adjustment for adjusted current earnings. In computing adjusted current earnings, IDCs on successful wells must be amortized over the longer of 60 months or the period used by the corporation for financial accounting purposes.

9. See discussion of oil and gas recovered through enhanced tertiary recovery techniques (A., above).

Effective date

The provision would be effective with respect to production, or costs paid or incurred, after the date of enactment and before January 1, 2010. Additionally, the provision would not apply to production, or costs paid or incurred, after December 31, 1999, unless such production or costs are attributable to a project begun before January 1, 2000.

Administration Proposal

The administration proposal would eliminate 80 percent of the present-law minimum tax preference for IDCs attributable to exploratory drilling incurred by independent producers.

C. Research and Development Tax Credit

Present Law

Present law provides for the allowance of a tax credit with respect to certain costs incurred by taxpayers for increasing qualified research activities (the "R&D credit"). The amount of the credit is equal to 20 percent of the excess of current qualified research expenses over the average of such expenses incurred by the taxpayer over the preceding three taxable years[10]. Also, a 20 percent credit is allowed for certain costs incurred domestically for an original investigation for the advancement of scientific knowledge which does not have a specific commercial objective.

Research which qualifies for the R&D credit includes research which is undertaken for the purpose of discovering information which is technological in nature, and the application of which is intended to be useful in the development of a new or

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10. However, in no event can the three-year base period average be less than one-half of the current qualified research expenses.

improved business component of the taxpayer. Under present law, qualified research can include certain costs incurred with respect to the development of new methods for extracting mineral deposits, including tertiary recovery methods[11].

Explanation of the Bill

Research credit for tertiary recovery methods

S. 828 would treat any research to discover or improve one or more tertiary recovery methods for domestic crude oil or natural gas as research which qualifies for the R&D credit if the research is based on accepted principles of engineering. The bill would apply the credit for tertiary recovery research separately from the credit for other R&D, including the determination of the three-year base period average applicable to such research. With respect to such research, the credit would be at a 10 percent rate[12].

Effective Date

The provision would be effective for amounts paid or incurred after the date of enactment, and before January 1, 2010. Amounts paid or incurred before the date of enactment would be taken into consideration in determining base period research expenses.

Administration Proposal

The administration proposal would provide a 10-percent tax credit for all capital expenditures on projects that represent the initial application of tertiary enhanced recovery techniques to a property. Additionally, with respect to the R&D

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11. See, for example, Rev. Rul. 74-67, 1974-1 C.B. 63.

12. Under the bill, it is unclear whether such research that would qualify for the R&D credit under present law would be creditable at the present-law rate of 20 percent instead of the 10 percent rate as provided in the bill.

credit, the Administration proposal would (1) compute the base period amount as an amount equal to 102 percent of the taxpayer's average qualified research expenses for the years 1983 through 1987, indexed for inflation, and (2) allow for an optional credit, in addition to the regular credit, equal to 7 percent of the current year's qualified research expenses in excess of 75 percent of the base period amount.

APPENDIX B

THE TEXAS INPUT/OUTPUT MODEL, 1986 UPDATE

164-Sector Multiplier Tables

TEXAS COMPTROLLER OF PUBLIC ACCOUNTS

DECEMBER 1989

APPENDIX TABLE 6.6
TEXAS EMPLOYMENT MULTIPLIERS <TYPE 1>
(EFFECTS IN JOBS PER MILLION DOLLARS OF OUTPUT)

SECTOR	SECTOR NAME	DIRECT EFFECT	TOTAL EFFECT	TOTAL EMPLOYMENT
1	Irrigated Crops	43.7919	54.6250	55063
2	Dryland Crops	31.4085	42.1505	95865
3	Range Livestock	17.1250	26.9987	30527
4	Feedlot Livestock	2.0887	16.1364	6890
5	Dairy	36.3310	51.3339	20066
6	Poultry and Eggs	31.7037	52.5886	20220
7	Cotton Ginning	50.1247	61.0428	6231
8	Agricultural Services	36.6740	48.7893	57873
9	Primary Forestry	2.9852	14.1964	1577
10	Fisheries	13.5836	22.7762	3347
11	Crude Petroleum and Natural Gas	7.3256	13.8684	146865
12	Natural Gas Liquids	1.7873	7.7762	6271
13	Oil and Gas Drilling	9.8219	20.3533	30938
14	Oil and Gas Exploration	9.2593	13.7475	15475
15	Oil and Gas Field Services	9.8215	13.8815	89755
16	Lignite and Other Surface Mining	4.7812	10.9721	12130
17	New Residential Construction	6.6833	24.7808	45926
18	New Light Construction	2.6604	11.6901	15793
19	New Industrial Construction	19.3133	29.5952	5698
20	New Road/Highway Construction	27.2863	38.8053	53220
21	New Heavy Construction	74.2249	84.5862	151758
22	Maintenance and Repair	40.6693	47.6654	293774
23	Meat and Poultry Products	6.0609	21.1313	26936
24	Canned and Preserved Foods	6.7364	18.8068	10285
25	Bakery Products	4.7905	13.3487	11028
26	Beverages	3.8886	13.9873	16805
27	Other Food Products	4.7989	14.5333	31953
28	Textile Mills	19.1108	26.5580	4535
29	Apparel and Other Textile Products	20.7943	24.5959	53938
30	Logging, Sawmills, Planing Mills	12.4526	22.5298	7362
31	Millwork and Wood	13.8657	22.5824	26037
32	Prefabricated Homes and Buildings	13.5689	22.2220	6395
33	Furniture and Fixtures	19.6637	26.7347	18725
34	Paper and Paper Mills	5.1254	11.7637	6648
35	Miscellaneous Converted Paper	8.0654	13.8419	8260
36	Boxes and Paper Containers	8.1715	14.1797	8327
37	Newspapers	18.3447	23.6528	31173
38	Publishing	15.0717	26.1360	9889
39	Printing	15.7980	20.1355	29242
40	Photographic and Printing Products	15.3787	20.9825	10993
41	Industrial Inorganic Chemicals	3.0923	9.7938	7012
42	Plastics and Fibers	2.7217	8.6336	5378
43	Synthetic Rubber	3.0117	12.3860	3577
44	Drugs	4.1373	10.4782	4554
45	Soaps, Cleansers, and Toiletries	4.3946	12.6601	3964
46	Paint and Allied Products	4.2039	10.1641	4155
47	Industrial Organic Chemicals	2.5900	11.2814	30830
48	Cyclic Crudes and Intermediates	2.5217	10.7234	3588
49	Agricultural Chemicals	3.1313	10.6635	5150

APPENDIX TABLE 6.6
TEXAS EMPLOYMENT MULTIPLIERS <TYPE 1>
(EFFECTS IN JOBS PER MILLION DOLLARS OF OUTPUT)

SECTOR	SECTOR NAME	DIRECT EFFECT	TOTAL EFFECT	TOTAL EMPLOYMENT
50	Other Chemicals	3.4133	12.1288	7117
51	Petroleum Refining	0.8840	7.9928	30548
52	Other Petroleum Products	1.3182	10.7526	3055
53	Tires and Rubber Products	0.5931	12.9243	5620
54	Plastic Products	12.4493	18.0001	26245
55	Leather and Products	22.2017	29.6284	7200
56	Glass	11.0611	16.7553	6801
57	Brick and Clay	15.9064	23.6586	7100
58	Cement and Concrete	12.6654	21.9744	23414
59	Nonmetallic Minerals	12.2069	20.2140	12563
60	Blast Furnaces	5.7813	12.0322	8738
61	Iron and Steel Foundries	8.2933	15.4071	7847
62	Primary Nonferrous Metals	5.9657	13.7618	12224
63	Fabricated Metals and Hardware	12.9793	18.4843	23348
64	Fabricated Steel	14.4019	21.7684	20679
65	Metal Plate Work	13.0799	19.4475	18853
66	Valves and Pipe Fittings	10.8526	15.4522	9836
67	Heavy Machinery	12.1136	16.9430	9385
68	Mining Machinery and Equipment	9.0787	14.2812	28051
69	Metal Working Machinery	10.4606	16.0449	7842
70	General Industrial Machinery	11.5151	17.9584	8981
71	Computers and Accounting Machinery	8.5297	16.5032	21254
72	Service Industry Machinery	12.7576	20.2868	18725
73	Refrigeration Machinery	12.0370	18.3867	13728
74	Electrical Apparatus	17.0346	22.6335	10564
75	Radio, TV and Phonographic Equipment	11.9985	18.5232	29339
76	Telephone and Telegraph Equipment	13.0233	21.0740	9087
77	Electronic Components and Equipment	14.3535	21.9825	19365
78	Semiconductors	12.4051	19.5189	43165
79	Other Electrical Apparatus	15.6305	24.1398	5642
80	Motor Vehicles and Parts	12.7113	17.2222	13824
81	Other Transportation Equipment	14.3917	23.0436	3647
82	Aircraft and Parts	8.7473	12.5204	46543
83	Ship and Boat Building	14.8043	21.3108	4033
84	Guided Missiles and Space Vehicles	8.2187	13.1964	15705
85	Scientific Instruments	8.9820	16.2086	10291
86	Photo, Timing and Optical Equipment	11.1285	17.3779	3636
87	Medical Instruments	10.3062	17.5603	8533
88	Other Manufacturing	18.8028	25.7315	17285
89	Ordnance	11.7005	20.0493	11387
90	Railroads	11.1219	15.1878	20881
91	Local and Intercity Transport	12.7743	18.1358	11753
92	Motor Freight and Storage	20.4255	27.6851	125782
93	Water Transport	8.9615	15.3238	15831
94	Air Transport	9.8062	16.5271	50649
95	Pipeline Transport	3.1790	11.3462	4682
96	Other Transportation Services	28.6222	39.1171	24701
97	Telephone and Telegraph	10.9090	14.4129	65935
98	Radio and TV Broadcasting	11.6257	20.5056	15690

APPENDIX TABLE 6.6
TEXAS EMPLOYMENT MULTIPLIERS <TYPE 1>
(EFFECTS IN JOBS PER MILLION DOLLARS OF OUTPUT)

SECTOR	SECTOR NAME	DIRECT EFFECT	TOTAL EFFECT	TOTAL EMPLOYMENT
99	Other Communications	10.1448	19.7869	9599
100	Electric Utilities	2.9856	9.1368	36205
101	Gas Utilities	1.7825	10.1391	20178
102	Water and Sanitary Services	10.9182	19.9859	24521
103	Wholesale Auto Parts and Supplies	4.7160	12.9291	26126
104	Wholesale Machinery and Equipment	18.6665	25.2558	133383
105	Wholesale Groceries	11.6904	17.8881	55935
106	Agricultural Supplies	18.2266	25.7395	21016
107	Wholesale Petroleum Products	5.2424	11.4492	25461
108	General Wholesale	10.3447	16.1946	186193
109	Lumber, Hardware and Related	25.8963	32.9856	55548
110	Department and Variety Stores	35.4393	42.7627	167427
111	Food Stores	40.2790	48.7502	248593
112	Auto Dealers	33.2761	38.6763	117051
113	Gasoline Service Stations	37.9197	43.9423	39471
114	Apparel and Accessory Stores	42.3994	48.7437	91609
115	Home Furnishing Stores	39.5549	49.9195	63147
116	Eating and Drinking Places	70.6918	79.8784	428427
117	Other Retail	19.5422	25.9843	225119
118	Banking Institutions	6.9212	13.5576	115635
119	Credit Institutions	8.2860	15.7697	91193
120	Security and Commodity Brokers	10.4578	19.8467	19761
121	Insurance	11.2461	34.8677	89630
122	Insurance Agents	25.0606	29.7738	65333
123	Real Estate	6.6622	13.2493	315137
124	Lodging Services	29.5325	39.5578	94622
125	Laundry and Cleaning Services	53.6780	63.1152	75219
126	Beauty and Barber Shops	99.8629	104.2505	50261
127	Miscellaneous Personal Services	58.7107	67.6275	44892
128	Advertising	15.6081	27.0787	15196
129	Photo, Video and Film Services	24.6816	32.2219	28680
130	Cleaning and Maintenance Services	107.2980	112.9443	71762
131	Personnel Services	78.0372	83.5016	96756
132	Computer Processing Services	18.6112	26.2483	70161
133	Research and Development Labs	18.4790	25.4211	19986
134	Management and Consulting Services	23.0908	32.9514	43371
135	Detective and Protective Services	71.1762	77.3476	44236
136	Equipment Rental	17.2152	24.8738	33728
137	Other Business Services	32.6810	38.3665	73208
138	Auto Rental	15.0185	23.4064	22106
139	Auto Repair	31.3066	36.8429	65475
140	Electrical and Other Repair Shops	38.3740	43.6559	42005
141	Motion Pictures and Amusements	25.6988	32.6869	75276
142	Physicians and Dentists	12.4072	18.3604	92152
143	Other Medical Services	39.4176	47.0333	67689
144	Hospital Services	21.9971	33.4347	216654
145	Medical and Dental Labs	18.1673	27.1543	45311
146	Legal Services	15.2759	21.7988	70691
147	Private Education	49.2110	61.3841	11351

APPENDIX TABLE 6.6
TEXAS EMPLOYMENT MULTIPLIERS <TYPE 1>
(EFFECTS IN JOBS PER MILLION DOLLARS OF OUTPUT)

SECTOR	SECTOR NAME	DIRECT EFFECT	TOTAL EFFECT	TOTAL EMPLOYMENT
148	Private Colleges and Universities	49.2085	58.5396	39729
149	Other Educational Services	22.9064	27.3550	13370
150	Social Services	29.4121	40.4082	38624
151	Day Care Services	23.8071	31.5949	27756
152	Nonprofit Groups and Museums	44.8838	58.2557	57954
153	Religious Organizations	35.4528	44.5059	31670
154	Domestic Services	214.4649	218.6816	147406
155	Engineering and Architecture	22.2749	28.7240	115940
156	Accounting and Bookkeeping	32.1880	39.6142	66870
157	Scrap and Secondhand Goods	12.8244	20.1263	3459

APPENDIX TABLE 6.6
TEXAS EMPLOYMENT MULTIPLIERS <TYPE 2>
(EFFECTS IN JOBS PER MILLION DOLLARS OF OUTPUT)

SECTOR	SECTOR NAME	DIRECT EFFECT	TOTAL EFFECT	TOTAL EMPLOYMENT
1	Irrigated Crops	43.7919	68.2697	55063
2	Dryland Crops	31.4685	57.3804	95865
3	Range Livestock	17.1250	43.7218	30527
4	Feedlot Livestock	2.0887	25.3098	6890
5	Dairy	36.3310	65.8538	20066
6	Poultry and Eggs	31.7037	62.0703	20220
7	Cotton Ginning	50.1247	76.2403	6231
8	Agricultural Services	36.6740	60.1278	57873
9	Primary Forestry	2.9852	24.3752	1577
10	Fisheries	13.5836	37.9696	3347
11	Crude Petroleum and Natural Gas	7.3256	25.7044	146865
12	Natural Gas Liquids	1.7873	17.0179	6271
13	Oil and Gas Drilling	9.8219	33.3089	30938
14	Oil and Gas Exploration	9.2593	27.0283	15475
15	Oil and Gas Field Services	9.8215	28.2303	89755
16	Lignite and Other Surface Mining	4.7812	22.7252	12130
17	New Residential Construction	6.6833	37.7379	45926
18	New Light Construction	2.6604	25.6865	15793
19	New Industrial Construction	19.3133	44.1015	5698
20	New Road/Highway Construction	27.2863	53.7601	53220
21	New Heavy Construction	74.2249	100.8856	151758
22	Maintenance and Repair	40.6693	62.8867	293774
23	Meat and Poultry Products	6.8689	31.4756	26936
24	Canned and Preserved Foods	6.7364	28.2583	10285
25	Bakery Products	4.7985	26.1985	11028
26	Beverages	3.8886	22.8187	16805
27	Other Food Products	4.7989	21.8449	31953
28	Textile Mills	19.1188	38.6365	4535
29	Apparel and Other Textile Products	20.7943	36.0401	53938
30	Logging, Sawmills, Planing Mills	12.4526	33.3953	7362
31	Millwork and Wood	13.8657	32.1842	26037
32	Prefabricated Homes and Buildings	13.5689	34.2016	6395
33	Furniture and Fixtures	19.6637	38.5174	18725
34	Paper and Paper Mills	5.1254	22.7427	6648
35	Miscellaneous Converted Paper	8.8654	24.9392	8260
36	Boxes and Paper Containers	8.1715	24.5445	8327
37	Newspapers	18.3447	34.5435	31173
38	Publishing	15.8717	38.7034	9889
39	Printing	15.7988	32.8645	29242
40	Photographic and Printing Products	15.3787	33.9848	10993
41	Industrial Inorganic Chemicals	3.8923	17.5524	7012
42	Plastics and Fibers	2.7217	15.4380	5378
43	Synthetic Rubber	3.8117	22.8896	3577
44	Drugs	4.1373	22.2287	4554
45	Soaps, Cleansers, and Toiletries	4.3946	22.9886	3944
46	Paint and Allied Products	4.2839	21.1385	4155
47	Industrial Organic Chemicals	2.5988	19.1919	30830
48	Cyclic Crudes and Intermediates	2.5217	20.2679	3885
49	Agricultural Chemicals	3.1313	19.8201	5150

APPENDIX TABLE 6.6
TEXAS EMPLOYMENT MULTIPLIERS <TYPE 2>
(EFFECTS IN JOBS PER MILLION DOLLARS OF OUTPUT)

SECTOR	SECTOR NAME	DIRECT EFFECT	TOTAL EFFECT	TOTAL EMPLOYMENT
50	Other Chemicals	3.4133	23.4713	7117
51	Petroleum Refining	0.8840	14.3993	30548
52	Other Petroleum Products	1.3182	21.0908	3055
53	Tires and Rubber Products	8.5931	23.5189	5620
54	Plastic Products	12.4493	28.2528	26245
55	Leather and Products	22.2017	42.8675	7200
56	Glass	11.0611	29.4506	6801
57	Brick and Clay	15.9864	35.9877	7100
58	Cement and Concrete	12.6454	33.6344	23414
59	Nonmetallic Minerals	12.2869	31.8218	12563
60	Blast Furnaces	5.7813	20.8432	8738
61	Iron and Steel Foundries	8.2933	28.6998	7847
62	Primary Nonferrous Metals	5.9657	24.8613	12224
63	Fabricated Metals and Hardware	12.9793	27.9833	23348
64	Fabricated Steel	14.4819	32.8174	20679
65	Metal Plate Work	13.0799	32.0919	18853
66	Valves and Pipe Fittings	10.8526	30.3129	9836
67	Heavy Machinery	12.1136	27.9547	9385
68	Mining Machinery and Equipment	9.0787	26.4745	28051
69	Metal Working Machinery	10.4606	30.6341	7842
70	General Industrial Machinery	11.5151	30.8052	8981
71	Computers and Accounting Machinery	8.5297	32.0304	21254
72	Service Industry Machinery	12.7576	36.8804	18725
73	Refrigeration Machinery	12.0370	28.7266	13729
74	Electrical Apparatus	17.0346	34.0330	10564
75	Radio, TV and Phonographic Equipment	11.9985	35.7288	29339
76	Telephone and Telegraph Equipment	13.0233	35.9155	9087
77	Electronic Components and Equipment	14.3535	37.4401	19365
78	Semiconductors	12.4051	35.6321	43165
79	Other Electrical Apparatus	15.6385	35.7148	5642
80	Motor Vehicles and Parts	12.7113	26.2560	13824
81	Other Transportation Equipment	14.3917	35.4073	3647
82	Aircraft and Parts	8.7473	22.9469	46543
83	Ship and Boat Building	14.8843	35.4090	4033
84	Guided Missiles and Space Vehicles	8.2187	28.7377	15705
85	Scientific Instruments	8.9820	26.7599	10291
86	Photo, Timing and Optical Equipment	11.1285	32.1114	3636
87	Medical Instruments	10.3862	29.0827	8533
88	Other Manufacturing	18.8828	39.5473	17285
89	Ordnance	11.7985	35.4149	11387
90	Railroads	11.1219	30.8097	20881
91	Local and Intercity Transport	12.7743	32.8167	11753
92	Motor Freight and Storage	20.4255	42.4483	125782
93	Water Transport	8.9615	29.9439	15831
94	Air Transport	9.8862	29.8255	50649
95	Pipeline Transport	3.1790	21.0075	4682
96	Other Transportation Services	28.6222	52.7380	24701
97	Telephone and Telegraph	10.9090	26.7868	65935
98	Radio and TV Broadcasting	11.6257	33.8390	15690

APPENDIX TABLE 6.6
TEXAS EMPLOYMENT MULTIPLIERS <TYPE 2>
(EFFECTS IN JOBS PER MILLION DOLLARS OF OUTPUT)

SECTOR	SECTOR NAME	DIRECT EFFECT	TOTAL EFFECT	TOTAL EMPLOYMENT
99	Other Communications	10.1448	34.5050	9599
100	Electric Utilities	2.9856	19.2370	36205
101	Gas Utilities	1.7825	18.1679	20178
102	Water and Sanitary Services	10.9182	35.2843	24521
103	Wholesale Auto Parts and Supplies	4.7160	25.9489	26126
104	Wholesale Machinery and Equipment	18.6665	39.2869	133383
105	Wholesale Groceries	11.6904	33.0837	55935
106	Agricultural Supplies	18.2266	39.3057	21016
107	Wholesale Petroleum Products	5.2424	24.7983	25461
108	General Wholesale	10.3447	30.6955	186193
109	Lumber, Hardware and Related	25.8963	48.2249	55548
110	Department and Variety Stores	35.4393	55.8010	167427
111	Food Stores	40.2790	61.8938	248593
112	Auto Dealers	33.2761	50.2811	117051
113	Gasoline Service Stations	37.9197	52.6684	39471
114	Apparel and Accessory Stores	42.3994	62.2759	91609
115	Home Furnishing Stores	39.5549	62.2919	63147
116	Eating and Drinking Places	70.6918	93.2174	428427
117	Other Retail	19.5422	39.6450	225119
118	Banking Institutions	6.9212	31.5090	115635
119	Credit Institutions	8.2860	32.5059	91193
120	Security and Commodity Brokers	10.4578	32.1839	19761
121	Insurance	11.2461	50.8146	89630
122	Insurance Agents	25.0606	46.7961	65333
123	Real Estate	6.6622	16.1648	315137
124	Lodging Services	29.5325	51.6106	94622
125	Laundry and Cleaning Services	53.6780	77.1021	75219
126	Beauty and Barber Shops	99.8629	118.3751	50261
127	Miscellaneous Personal Services	58.7107	79.4736	44892
128	Advertising	15.6081	42.6701	15196
129	Photo, Video and Film Services	24.6816	45.2106	28680
130	Cleaning and Maintenance Services	107.2980	130.7918	71762
131	Personnel Services	78.0372	101.6007	96756
132	Computer Processing Services	18.6112	43.0478	70161
133	Research and Development Labs	18.4790	41.5457	19986
134	Management and Consulting Services	23.0908	48.9231	43371
135	Detective and Protective Services	71.1762	95.7255	44236
136	Equipment Rental	17.2152	35.0538	33728
137	Other Business Services	32.6810	55.9079	73208
138	Auto Rental	15.0185	33.4082	22106
139	Auto Repair	31.3066	48.3080	65475
140	Electrical and Other Repair Shops	38.3740	60.4503	42005
141	Motion Pictures and Amusements	25.6988	48.5047	75276
142	Physicians and Dentists	12.4072	37.0805	92152
143	Other Medical Services	39.4176	60.2353	67889
144	Hospital Services	21.9971	49.7151	216654
145	Medical and Dental Labs	18.1673	41.6344	45311
146	Legal Services	15.2759	34.0228	70691
147	Private Education	49.2110	77.0328	11351

APPENDIX TABLE 6.6
TEXAS EMPLOYMENT MULTIPLIERS <TYPE 2>
(EFFECTS IN JOBS PER MILLION DOLLARS OF OUTPUT)

SECTOR	SECTOR NAME	DIRECT EFFECT	TOTAL EFFECT	TOTAL EMPLOYMENT
148	Private Colleges and Universities	49.2685	75.9930	39729
149	Other Educational Services	22.9064	45.5940	13370
150	Social Services	29.4121	58.8109	38624
151	Day Care Services	23.8071	48.2249	27756
152	Nonprofit Groups and Museums	44.8838	74.7662	57954
153	Religious Organizations	35.4528	61.7345	31670
154	Domestic Services	214.4649	238.0470	147406
155	Engineering and Architecture	22.2749	46.2642	115940
156	Accounting and Bookkeeping	32.1880	56.4468	66870
157	Scrap and Secondhand Goods	12.8244	35.6705	3459

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